EXCLUSIVE PREVIEW

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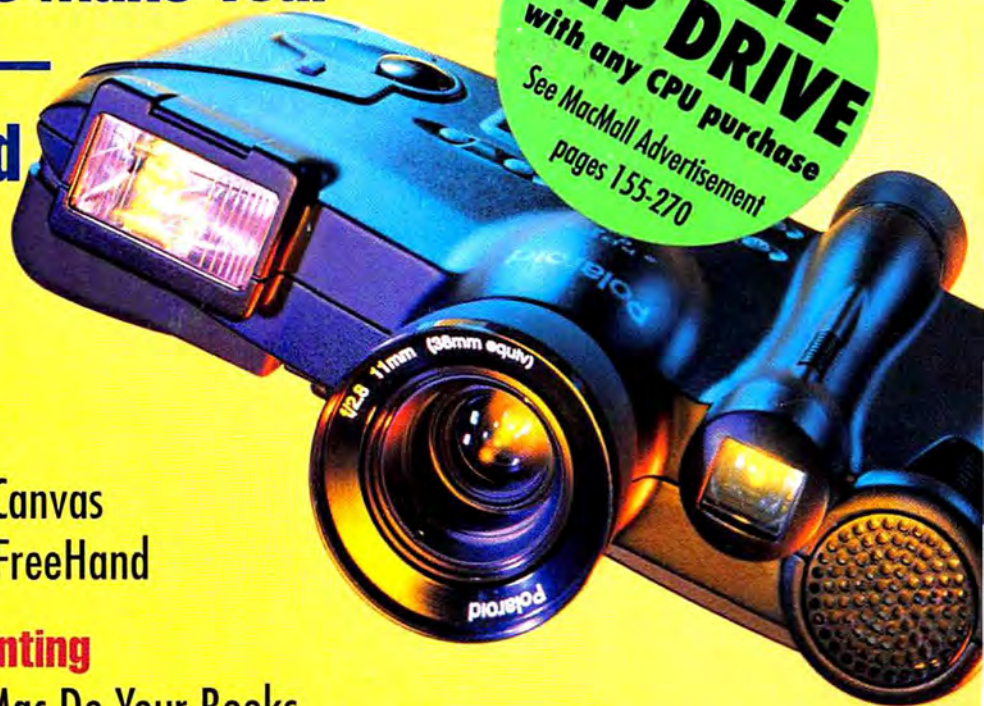

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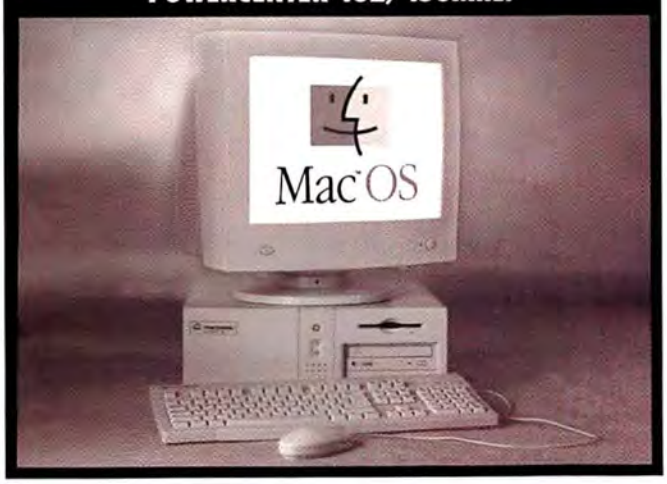

"PERFORMANCE AND PRICE COMBINE TO MAKE THE POWERCENTER THE MOST SENSIBLE CHOICE FOR BUSINESS AND GRAPHICS." – Macworld Magazine, July, 1996

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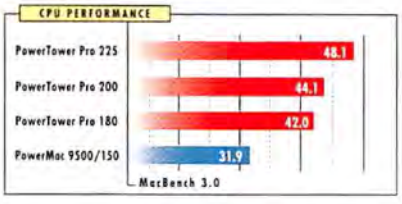
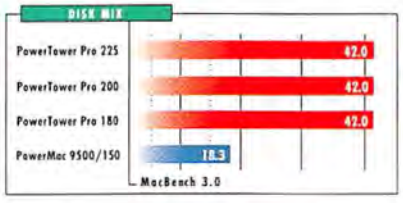
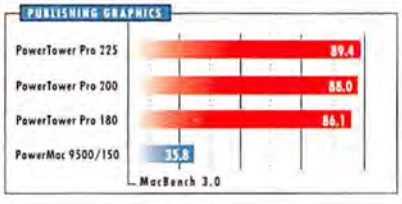
PowerTower Pro features the new PowerPC 604e at 225, 200 or 180 MHz. No other system currently on the market can match those clock speeds. 6 PCI slots. A 1 MB Level 2 cache. Interleaved memory. 8MB of VRAM. A 2 GB 7200 RPM AV-capable hard drive. And nine expansion bays. PowerTower Pro features an upgradeable CPU - making future upgrades, including dual-processors, a snap.

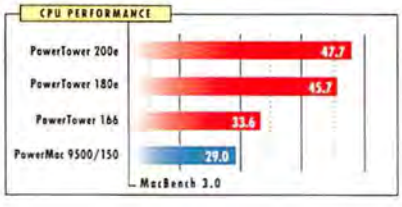


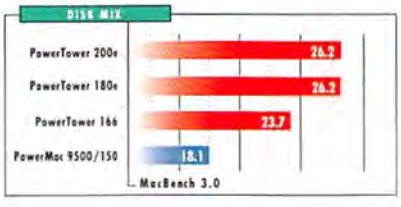


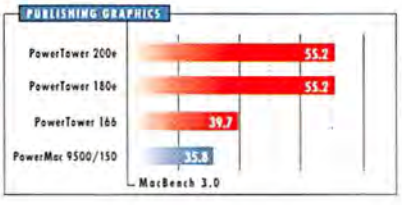


POWERTOWER - THE MOST AFFORDABLE HIGH PERFORMANCE SYSTEMS.

The PowerTower is a graphics workhorse the pundits are quickly recognizing as the next logical step beyond Apple's PowerMac. Just compare the overall performance, speed and price. PowerTowers ship with plenty of RAM and VRAM, a large L2 cache & valuable software. And of course, we'll configure your PowerTower exactly the way you want - delivering it direct from our factory to your door.

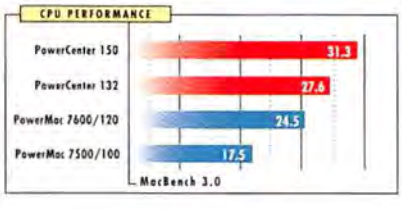


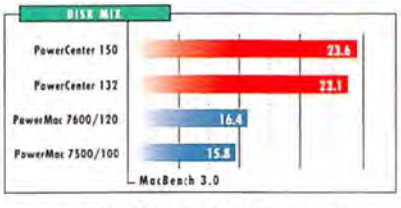


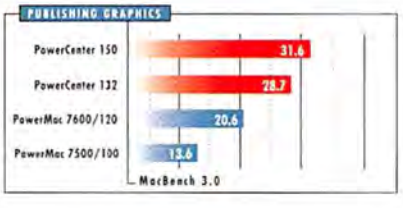


POWERCENTER™ - FINALLY, POWERPC 604 PERFORMANCE FOR THE MASSES.

Don't settle for a 601 PowerPC CPU. For many, the best place to start is with a PowerCenter. Power Computing's mid-range systems that are comparable to competing high-end machines. PowerCenters ship with 150 and 132MHz upgradeable 604 CPUs, 16MB of RAM, 3 PCI expansion slots, and a free software bundle makeing it the obvious choice for small-office, home-office, enterprise and graphics users.







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- 6 PCI Expansion Slots
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180MHz PowerPC 604e Processor
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- 2 GB 7200 RPM AV Capable Hard Drive
- 8X CD-ROM Drive
- 1 MB Level 2 Cache
- IMS Twin Turbo 128M graphics accelerator with 8MB VRAM
- 6 PCI Expansion Slots
- Interleaved Memory
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- 2 GB 7200 RPM AV Capable Hard Drive
- 8x CD-ROM Drive
- 512K Level 2 Cache
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- 2 MB VRAM On-Board (4 MB Max)
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- 3 PCI Expansion Slots
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- 1 GB Hard Drive
- Quad-Speed (4x) CD-ROM Drive
- 512K Level 2 Cache
- 1 MB VRAM On-Board (4 MB Max)
- 3 PCI Expansion Slots
- Desktop Enclosure
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the System 7.5 Update 2.0, please visit **//www.microsoft.com/macoffice/**. Or to order a free Microsoft Empowerment Pack for the Mac, which includes a CD-ROM with the software listed above plus a special offer on RAM from Kingston Technology, call 800-469-6520 Dept. MCA.

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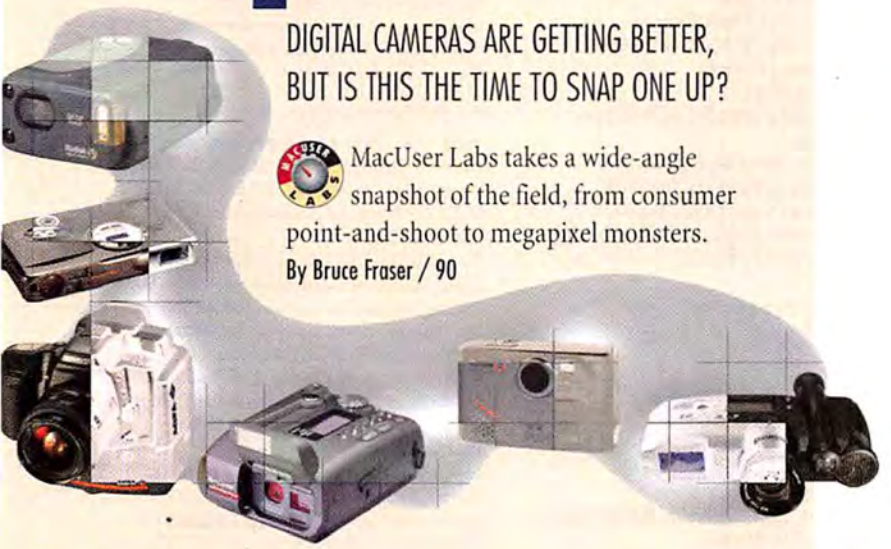

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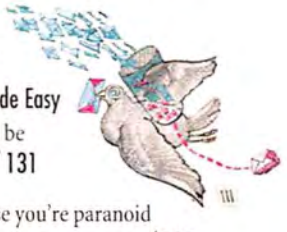

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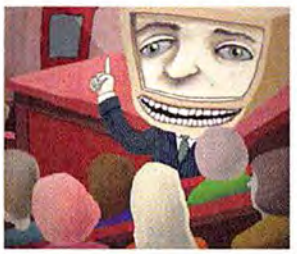

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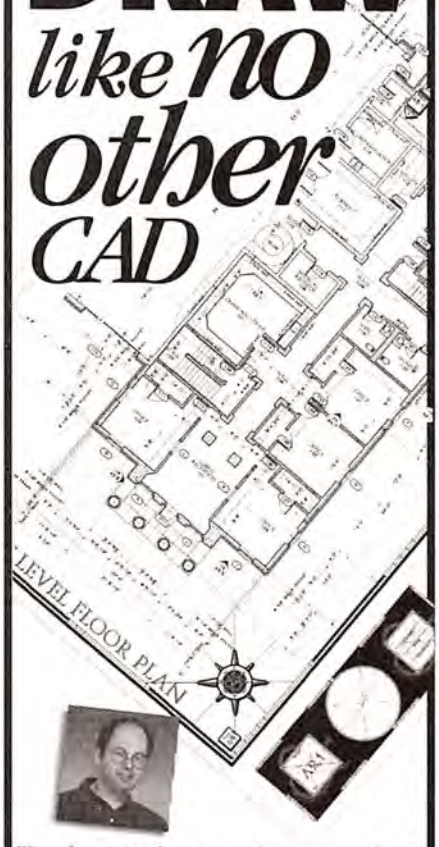

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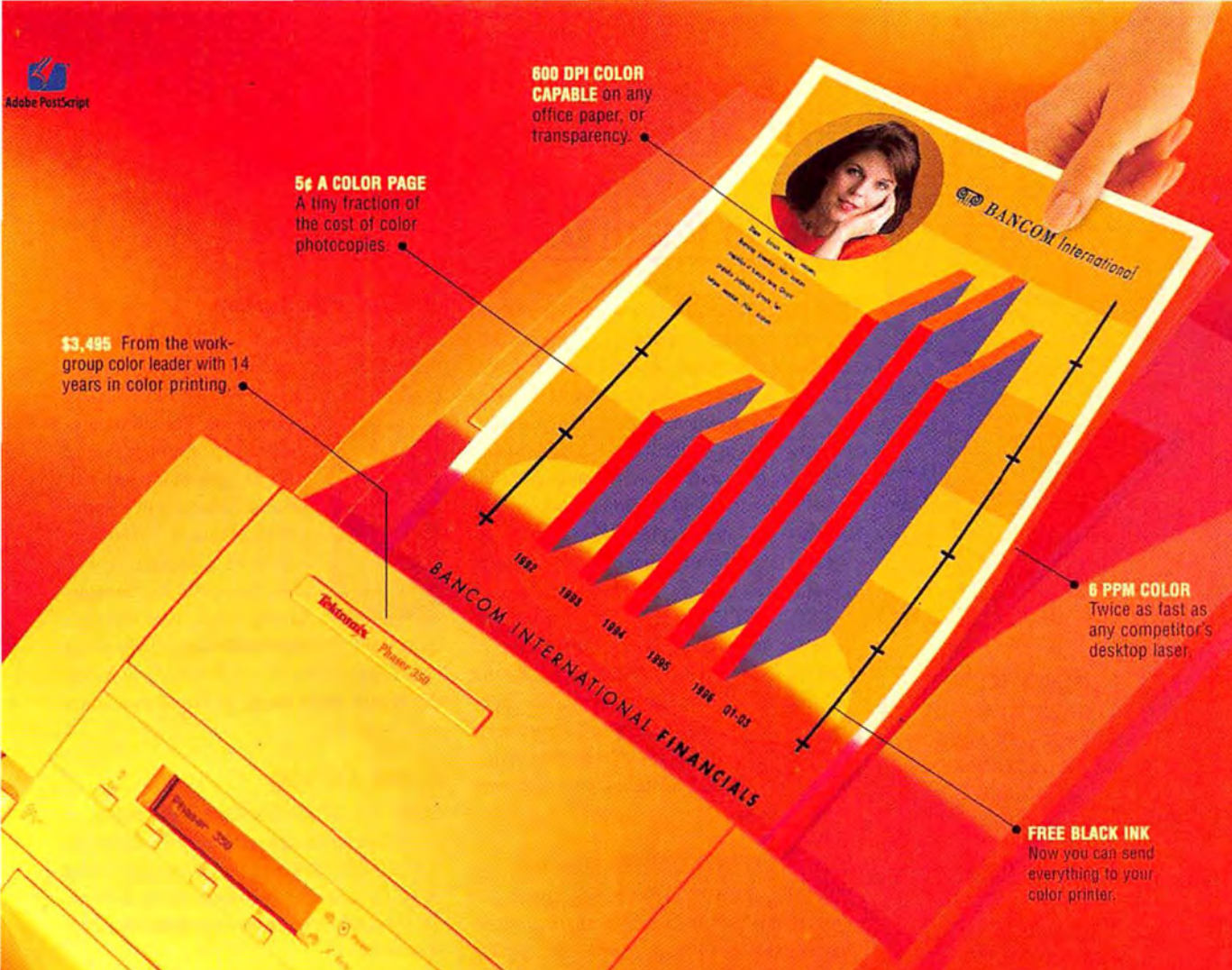

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MacUser
COMING SOON:
97
JANUARY

WYSIWYG WEB AUTHORING TOOLS
Find out in the January issue of MacUser how visual Web authoring tools compare to code-based tools. Tonya Engst, an Internet guru, looks at the new generation of visual Web tools as well as upgrades to existing products to see if visual tools are in fact as powerful as their code-based counterparts. What You See in MacUser Is What You Get — plus much much more!

BIG GIG HARD DRIVES
Whether you work with enormous digital video or graphics files, or massive databases, or do a lot of archiving, you might want to consider a larger hard drive. Especially since hard drives these days are bigger, faster and cheaper. In the January issue, MacUser Labs tests, reviews and mouse-rates 3.5-GB-and-greater hard drives using MacBench 3.0, the industry's benchmark standard. The experts look at speed, price, warranties, customer service and design and construction. MacUser stores more valuable information.

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MacUser

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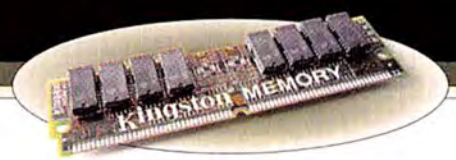

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LETTERS

Lean, Mean, and Green

I AM SOMEWHAT astonished by the unbridled consumerism I see in this industry: bigger, better, faster, newer — buy, buy, buy. This situation certainly runs counter to the environmental movement; however, I think it presents an opportunity for Apple to establish a niche as *the* company whose products are *not* instantly outdated, whose service is friendly and flawless, and whose support of equipment and system updates includes recycling programs. (I am haunted by a mountain of old computer equipment that our local school district simply left outside in the rain for lack of a better idea. Yes, they were old Macs.)

I realize this suggestion runs counter to the present thrust of the industry. But if there's a market for non-nerds like me, surely there's a place for a "green" service. It could be a profit-making business venture that would create new jobs as well as improve public relations.

Michaele Benedict
BenedictML@aol.com

Esprit de Corps Wins the War

WHY DOES APPLE seem to get so little support from Claris? Isn't Claris supposed to be a wholly owned part of Apple? If you look at how long it takes Claris to support OS innovations from Apple, you'd think that Claris was a completely separate and independent company.

One of the reasons Microsoft is successful is because its applications division totally supports everything the operating-systems division does. If the Microsoft OS division creates a new feature for Windows, the applications division supports that feature in all Microsoft applications. This is simply not true with Apple and Claris. For example, Claris has yet to offer support for QuickDraw GX in any of its applications. QuickDraw GX has been available for about two years now, and if Apple had its act together, Claris would have extensive QuickDraw GX support in every application it makes. Another example is OpenDoc. Sure, Claris is adding OpenDoc-container support to ClarisWorks, but I don't think this goes far enough. If Apple were thinking for success, it would have Claris supporting every aspect of OpenDoc and Cyberdog in every application now.

Nobody can deny that Microsoft is spectacularly successful. Apple could learn a lot from Microsoft in how the applications division of the latter supports what the OS division does. Granted, there seems to be a lack of coordination in the other direction as well — the Mac OS-development division at Apple does not seem to be well attuned to what Claris is doing. These are big problems, and I don't think Apple is going to get anywhere until they are resolved.

Marc Barrett
Council Bluffs, IA

Fastest in Its Heat

THANKS FOR THE DATA in your review of Power Computing's 225-MHz machines (September '96, page 37). When you call the PowerTower Pro 225 the fastest desktop computer, you're counting only Macs, Wintel machines, and clones, right? Just so you know, Digital's machines have been up to 300 MHz for a while now. And although they may be in a different cost zone, there are 233-MHz Alpha stations available in the $2,000 to $5,000 range.

Nevin Baker
White Lake, MI

/ The distinction between desktop systems and workstations is blurring these days. But, yes — we were specifically referring to Mac OS and Wintel systems. / HB

WRITE TO LETTERS

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Open Folder

Eugene Pomerance, of Elmhurst, Illinois, sent us an RSVP saying our magazine was FUBAR (i.e., he disapproves of our liberal use of acronyms and specialized computer terms). "I know that specialized vocabulary is needed and that most of it is used to keep outsiders out and make insiders feel important. I have no intention of forgoing all other mental activity just to learn, relearn, and memorize the language (INITs, frames, LED, PICT, TIFF, EPS, etc.) used in *MacUser*," said Mr. Pomerance. Granted, it is SOP for us to use such terminology; the MO of our writers is to educate the fairly well-informed reader (a.k.a. the Mac user). If you don't BYO base knowledge to some of our more complex stories, you might be SOL. But we don't do it to be the BMOC (or BWOC, for you PC types out there). This jive is just the lingua franca of the digital domain. Dig?

Mac enthusiast-cum-cryptographer Dane Carlson has no problem with *MacUser* esoterica. After reading our July Net Traveler column, in which we said that *basura/x-vil* was Spanish for *Microsoft Windows,* Dane quickly grabbed for the nearest Captain Crunch decoder ring (or would that be Capitán Crunch?) and deciphered our polyglot poke at the Redmond, Washington, *ventanas* vendor. Upon learning that *basura* was actually the Spanish word for *trash,* Dane wrote and said, "I must wholeheartedly agree."

The wacky word fun doesn't stop there, however. B. J. Leiderman of Virginia Beach, Virginia, asks, "Why does Apple keep misnaming components of its system software? First there was the 'Finder,' which until recently couldn't find a haystack on a needle. Then came the 'Chooser.' Choose what, total confusion? I'm just glad Apple doesn't have name domain over other things in life. Otherwise, I'd probably have to go to, let's say, a *dog catcher* to watch a movie and to my, umm, *broadcaster* to make breakfast." B. J., our Capitán Crunch decoder ring detects a whiff of *sarcasmo* and suggests that you use a little *imaginación.* After all, we're talking about a computer company named after a pome.

Eight Isn't Enough

I'VE BEEN WAITING for Copland to arrive ever since the rumors of its development bubbled up a couple of years ago. And I, like many, headed straight for therapy when I heard that its 1996 release was a no-go.

Seriously, though, a couple of questions come to mind. In "The State of 8" (August '96, page 69), you state: "Specifically, the parts of applications that can't currently be multitasked are user-interface-toolbox routines." Ouch! Aren't user-interface-toolbox routines the main user interaction when you're working with any application? And if they are and Copland doesn't protect them, how would that improve things?

Virtual memory is always on? Unless Apple's programmers have come up with the ultimate disk-caching routines, this seems like a problem. Or are they assuming that FireWire will be the norm by then?

"The more applications you run at once, the slower your Mac will be." Please say it isn't so.

On the good side, I believe in Apple and I am more than willing to wait for System 8 — especially with innovations such as the offer of various sets of personal preferences. Apple should develop new technologies that fit its history of innovation and *not* make something compatible with Wintel machines first. If consumers have to buy an Apple product because its proprietary technology allows them to do more, then so be it.

Colin Smith
cgsmith@sentex.net

THANKS FOR the informative and provocative update on System 8. A few reactions:

No extensions means no RAM Doubler. This means that virtual memory has to work a *lot* better so that it is virtually transparent to users.

Likewise no Speed Doubler. This means that Apple has to develop a much better compiler so that users can run 680x0 applications without any degradation in performance. I'd hate it if Word 5.1 ran slower on System 8 than on System 7.5.3 with Speed Doubler. Indeed, if this were the case, since I rely heavily on Word for my work, I might walk away from System 8.

It may be a corporate Bad Move to shove GX printing down everybody's throat. GX has been one of the larger eggs laid by Apple in recent years; it is liked neither by users nor by software developers.

An even dumber Bad Move might be to force developers to rewrite their programs to run under System 8. At this point in Apple's corporate history, some software vendors might choose to walk away from the Mac altogether rather than be required to issue System 8 versions. The last thing Apple needs is a conspicuous migration away from the Mac platform.

Dana
DanaS64562@aol.com

I PURCHASED my first Mac, a 512K, back in 1985; since then, I have developed and used applications on a variety of platforms, including SunOS, Solaris, Windows 95, Windows NT, AIX, NeXTSTEP and OPENSTEP, and OS/2.

Now, having suffered blood, sweat, and tears over a hardware-flawed PowerBook 5300ce running System 7.5.2 and 7.5.3, I believe that the Mac OS is doomed, because the System 8 upgrade is too little, too late. The features of Mac OS 8 are less than those found in the 1990 release of NeXTSTEP 1.0 and, by the way, those found in Windows NT 4.0 and Windows 95.

Understand that I loved the Mac, but I am no longer willing to suspend my disbelief regarding Apple's plight: System 7.5.x is a frigid and fragile OS equal to Windows 3.1.

Mac OS 8 is six years behind the likes of Next Software's OPENSTEP 4.0 and Sun's WorkBench desktop environment (which incorporates OPENSTEP).

A. Chase Turner
cturner@bbn.com

COPLAND (SYSTEM 8) is a major rewrite of the Mac OS. Because so much code is being rewritten, we should not expect a quick release. We don't have to wait for Copland. We can promote System 7.5, because Apple will be releasing new stuff. Windows 95 is not really a threat if you look at the chain of dissatisfied customers.

Arne Quanbeck
via the Internet

A Different Spin on Web Tools

YOU DID A GREAT JOB of comparing the latest Web authoring tools ("The Web Author's Workshop," August '96, page 80). But you should have mentioned Page Spinner 1.2. It's better than WYSIWYG applications, because with one click, it will save changes to your HTML document and display your Web page in the Web browser of your choice. It also comes with many helpful tools for creating Web pages. It's a downloadable shareware program (http://www.algonet.se/~optima/pagespinner.html) that costs only $25.

Leland Raymond III
leland@dentalsite.com

YOU MISSED ONE of my favorite HTML tools: Alpha (v6.1.2). This program is similar to BBEdit Lite — offering text-only editing (no WYSIWYG), drag-and-drop support, and colored HTML tags. However, I find Alpha easier to use. Menu choices make HTML tags easily accessible, and you can add your own tags through the (reasonably) simple process of editing a configuration file. Adding links to HTML documents is easy, especially since Alpha automatically saves the links you enter and allows you to select them later from a scrollable list. Alpha will call up your Web browser and send the current HTML document to it so you can view your work.

Alpha contains an enormous set of features, including advanced search capabilities. For my money, it's the best shareware HTML editor out there, surpassing even commercial programs.

Thomas Hopper
tjh@ic.net

GONET'S GOLIVE 1.0.1 is the best Web publishing program there is. The ease of creating frames, the Macintosh interface, the number of HTML tags supported, and the price are enough to beat PageMill. Yes, the program does have shortcomings, but PageMill also has its fair share of those. I expect that this company's development cycle is very short, so I think all of GoLive's problems will be fixed and even more features will be added before long.

Tony Borich
jemabo@earthlink.net

YOU FAILED TO MENTION the twinkle in every QuarkXPress user's eye: QuarkImmedia. This program can create Web pages with full audiovisual capabilities — without requiring any knowledge of HTML.

Ken Zakovich
vgvh@uslink.net

Soft Sell

I DON'T UNDERSTAND why SoftWindows 95 for Power Macintosh received a rating of only 2.5 mice (see review, August '96, page 60). The only serious gripes you have concerning SoftWindows 95 are its speed and the amount of RAM it requires to run applications. As far as

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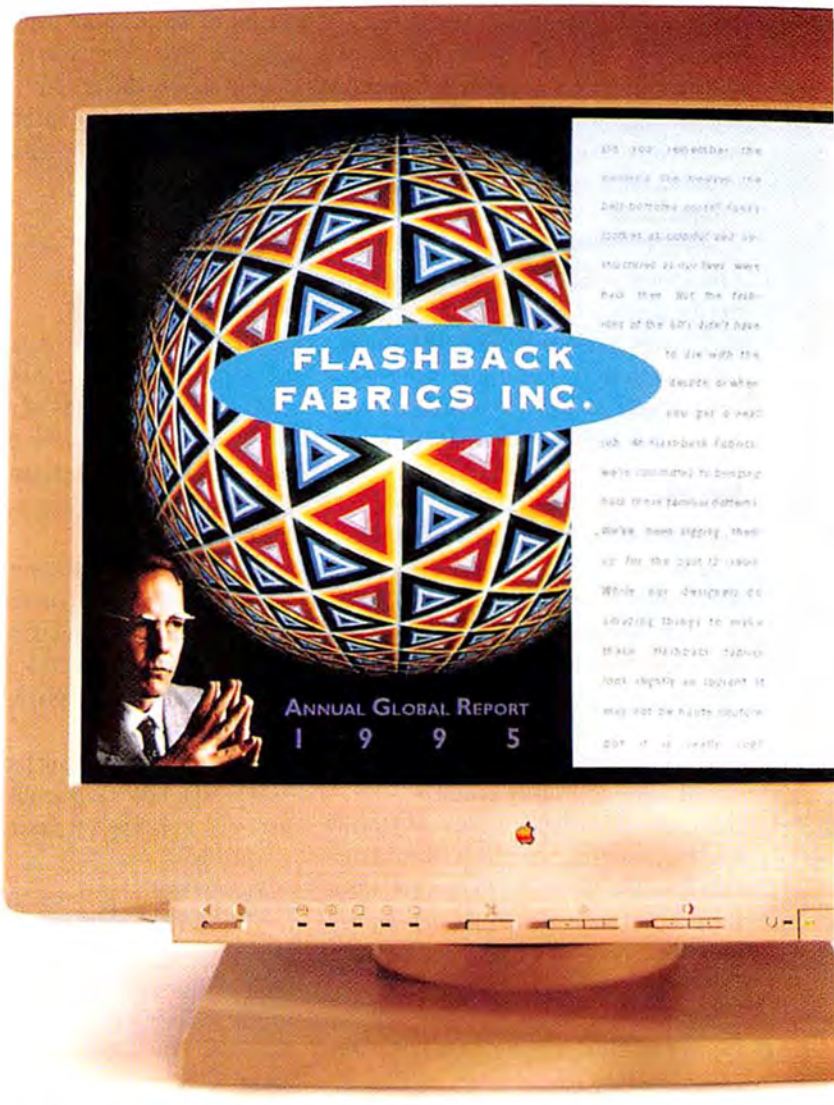

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speed is concerned, I have two points. First, the purpose of SoftWindows 95 is not to replace a fast PC. Instead, as you yourselves suggest, the program's intent is to allow a typical Mac user occasional use of PC applications. Second, there is often, in my opinion, an overemphasis on benchmark speeds. It is rare for users to utilize applications in a way that pins the CPU at 100-percent use for extended periods of time. Instead, I submit that typical users perform interactive work in short bursts of CPU use. This is exactly why you suggest that the "subjective speed" of some Windows apps running on SoftWindows 95 doesn't seem that bad. Again, there are times when extreme speed is required, but this is the exception to the rule rather than the norm.

Concerning the large RAM requirements of SoftWindows 95: Although the program itself certainly is resource-intensive, I suggest that the real hog is Windows 95. And there's nothing that Insignia can do about that. You'll have to blame Microsoft for that one.

Chris Ciolorito
ciolori@voicenet.com

/ The point of our benchmarks is to overload a system or subsystem to as close to failure as we can. The hardware that best withstands the onslaught is necessarily the best performer under high-intensity use. And, after all, high-end machines are made specifically for high-intensity use. / NG

Pity PD

YOUR ARTICLE on removable-media drives (August '96, page 88) was quite unfair to the new PD drives and their vendors. You chose to review only one PD drive — the one with notoriously bad driver software. You also try to scare the innocent by warning that "with only a handful of vendors selling PD Drives, you could find yourself with a cartridge containing data and no drive to read it."

My APS combination PD/CD-ROM drive has driver software that works flawlessly. I can't speak for the other vendors, but APS is shipping hundreds of these two-for-one bargain units.

Mario S. De Pillis
Amherst, MA

/ Because the article focused on removable-media drive mechanisms (not third-party products such as those from APS), we tested a drive from Panasonic, the developer of PD-drive technology. We stand by our evaluation of the software that Panasonic chose to bundle. You can, as you stated, get a PD drive with different software if you buy one from a different vendor. As for scaring our readers — that's something we'd never do intentionally, but if only "hundreds" of drives are being sold rather than thousands, then you've just proven our point. / RL

Paper Power

I SAW YOUR WRITE-UP on LaserMerge Electronic Paper (New & Notable, August '96, page 28). It sounded interesting, so I gave it a try. You listed things this software could do, but believe me, those things were secondary to the real power of this software.

The product can control your printer in a way never imagined. It takes over from the application and controls the printer driver and printer memory and lets the printer output a lot faster. It can control toner levels and dots per inch. You can print multiple copies of a print job even when the application has sent it only once to the printer. This program is awesome! It comes with all the Avery Business templates and really is a hundred paper trays in one.

Jeff Bagwell
via the Internet

Game Shame

IS THERE ANY WAY to expand your coverage of Mac games? The idea of having a small oasis of fun in the middle of pages of boring graphics programs and Web-page editors is a great one. However, The Game Room is confined to a single sheet of paper in your 200-plus-page magazine.

It is true that we Mac gamers are a generally ignored group, cast off early by Apple in the rush to make the young Macintosh look like a serious computer. It's strange when you think about it: The most playful computer has the least fun software.

Mac gamers are some of the most devoted people who have ever double-clicked on a hard-disk icon. Don't we deserve more than a single page?

Matthew Boyd
kboyd@eagle1.eaglenet.com

I READ YOUR REVIEW of X-Wing Collector's CD-ROM (The Game Room, August '96, page 128), and I could not agree more about the sound being "tinny." Of course it is. Mac sound bites! Like a lot of other things about our favorite machine, the built-in sound capabilities leave a lot to be desired in 1996. It's time to stop coasting in the audio department.

Steve Craft
scraft@nothinbut.net

System 7.5.3 Update

THANK YOU FOR PRINTING all those letters in a recent issue regarding the disabling properties of System 7.5.3 (Letters, August '96, page 13).

I had purchased an HP DeskWriter 660C printer at about the same time as I installed the system update. The Chooser would not choose, and the printer would quit halfway through printing. I kept calling Hewlett-Packard's tech support, and nothing I was told to do helped.

My Power Mac 8100/80 runs fine now that I've trashed the system update. I was about ready to trash my printer instead! I thought I was in computer hell for a while.

Rhonda Wiebe
Littleton, CO

PLEASE, PLEASE emphasize to your readers that if they update to System 7.5.3, they *must* update their hard-disk driver. It can make the difference between disaster and success in your computing day.

Laura M. Wheeler
Melstone, MT

Corrections

Our review of Eudora Pro 3.0 (October '96, page 61) should have stated that Eudora Pro's formatted text messages are supported by various e-mail programs, including Netscape Navigator and several UNIX mailers.

The correct price for the Latitude Cross-Platform Development Kit (The Geek Beat, September '96, page 25) is $499 per UNIX platform.

In our review of Power Computing's PowerTower models (September '96, page 37), we said that Intel had not shipped 200-MHz Pentium Pro processors when we should have said 200-MHz Pentium processors (non-Pro). Since the article went to press, 200-MHz Pentium-based systems have begun shipping.

Digidesign's Audiomedia II and Audiomedia III cards ("Sound Investments," September '96, page 85) work only with the Windows version of Digidesign's Session 2.0 multitrack audio editor. Macintosh users can use only the Mac's built-in audio.

The correct toll-free number for Sun Remarketing (Help Folder, September '96, page 106) is 800-821-3221.

The correct name of Sonic Desktop Software's audio editor (New & Notable, August '96, page 28) is SmartSound for Multimedia.

BBEdit 4.0 ("The Web Author's Workshop," August '96, page 80) should have been listed as a tool capable of learning HTML tags, via its Custom Markup command.

The correct toll-free number for Now Software (Reviews, July '96, page 44) is 800-237-2078 .

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Editor in Chief
Macweek
July 24, 1995

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August, 1995

MacOS

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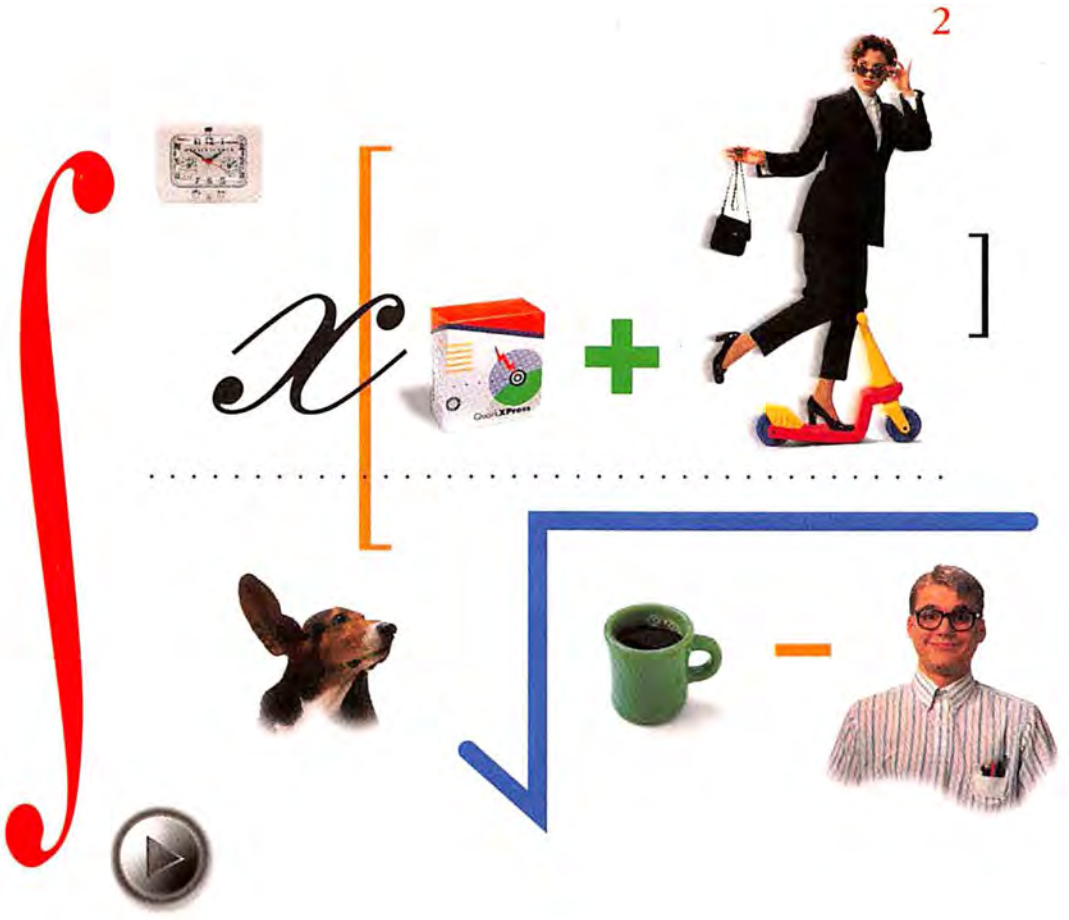

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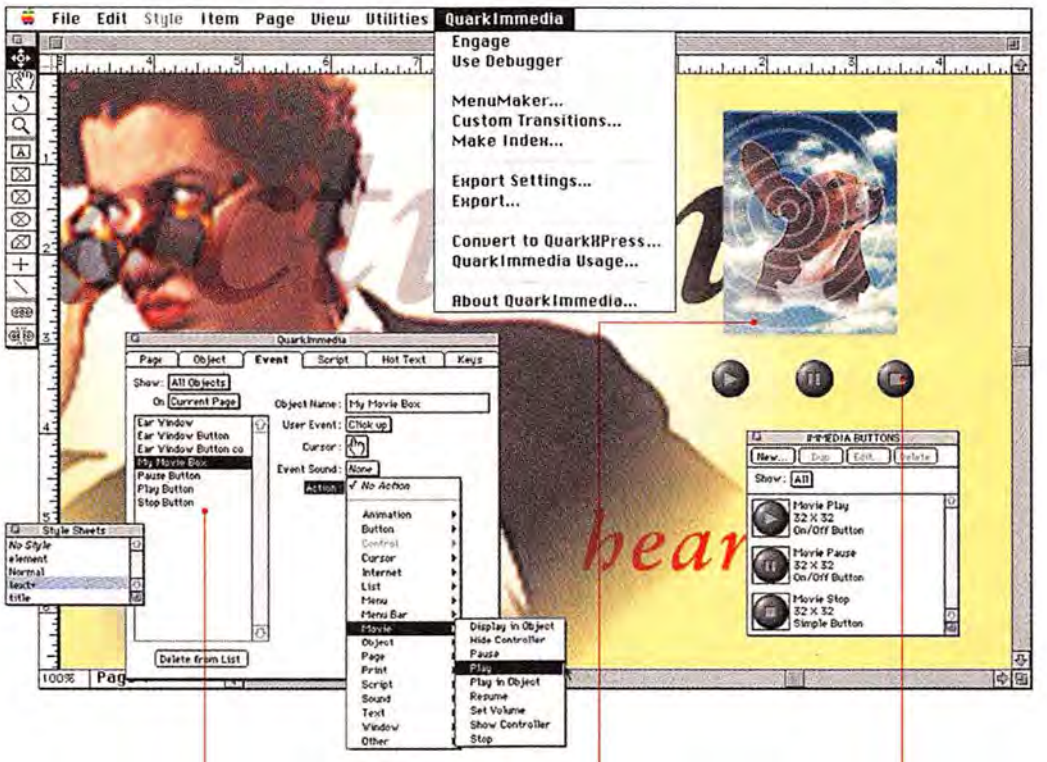

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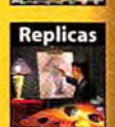

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PAMELA PFIFFNER

Death and Resurrection

COPLAND IS DEAD. Apple has now decided to kill its plans for the much delayed, massive operating-system overhaul that was last expected to ship next summer. Instead, the company will roll out smaller updates to the Mac OS at six-month intervals.

This is a Good Thing.

I'll wait a moment for you to lift your jaws off the floor (pause). OK. Let me give you my reasons for why Copland's death is a good thing and how the killing of Copland may, in fact, save the Macintosh OS.

Reason #1: Copland has become an albatross around Apple's neck, a symbol of all that's wrong with the Mac and an emblem of Apple's inability to effectively compete with Microsoft's now entrenched Windows 95 and newly surging Windows NT. There's a stigma attached to Copland left over from years of mismanagement that the new regime now leaves behind.

Reason #2: Personal computing has changed substantially since the blueprints were made for Copland (I won't call it Mac OS 8, because there will still be a Mac OS 8, just not the one we think of as Copland). For instance, look at the phenomenal growth of the Internet. Customers now expect more-savvy networking and Internet access from their computers. But Copland was started well before the Internet boom and would have to have been significantly overhauled to really integrate the Net. And, no, Cyberdog doesn't cut it; the Internet must be an integral part of how the OS works, not just expressed in some clever bundleware.

In other words, while Apple has been working with mad-scientist-like focus on a big lumbering beast composed of salvaged body parts, the world outside Castle Coplandstein has passed it by.

Reason #3: The sum of Copland's parts is greater than the whole, but waiting for all the parts to be ready for one OS release has been like waiting for another famous no-show, Godot.

Customers want and need preemptive multitasking and protected memory. But because these considerably more complex OS technologies have been components of Copland, other, less complex but equally important parts have had to wait. For example, two and a half years after the first PowerPC-based Macs shipped, the Mac OS is still largely 680x0 code, slowing everything down. Critical bottlenecks, such as the File Manager, are still not PowerPC-native, because those components have been waiting for the rest of Copland to happen. The fastest personal computers on earth have to stop and digitally tap their feet, waiting for a poky OS to get back to them with data.

A decentralized approach to OS development will help put key technologies into users' Macs faster. The best technologies destined for Copland will find their way into the operating system when they're ready and won't have to wait for everything else to be done before they ship.

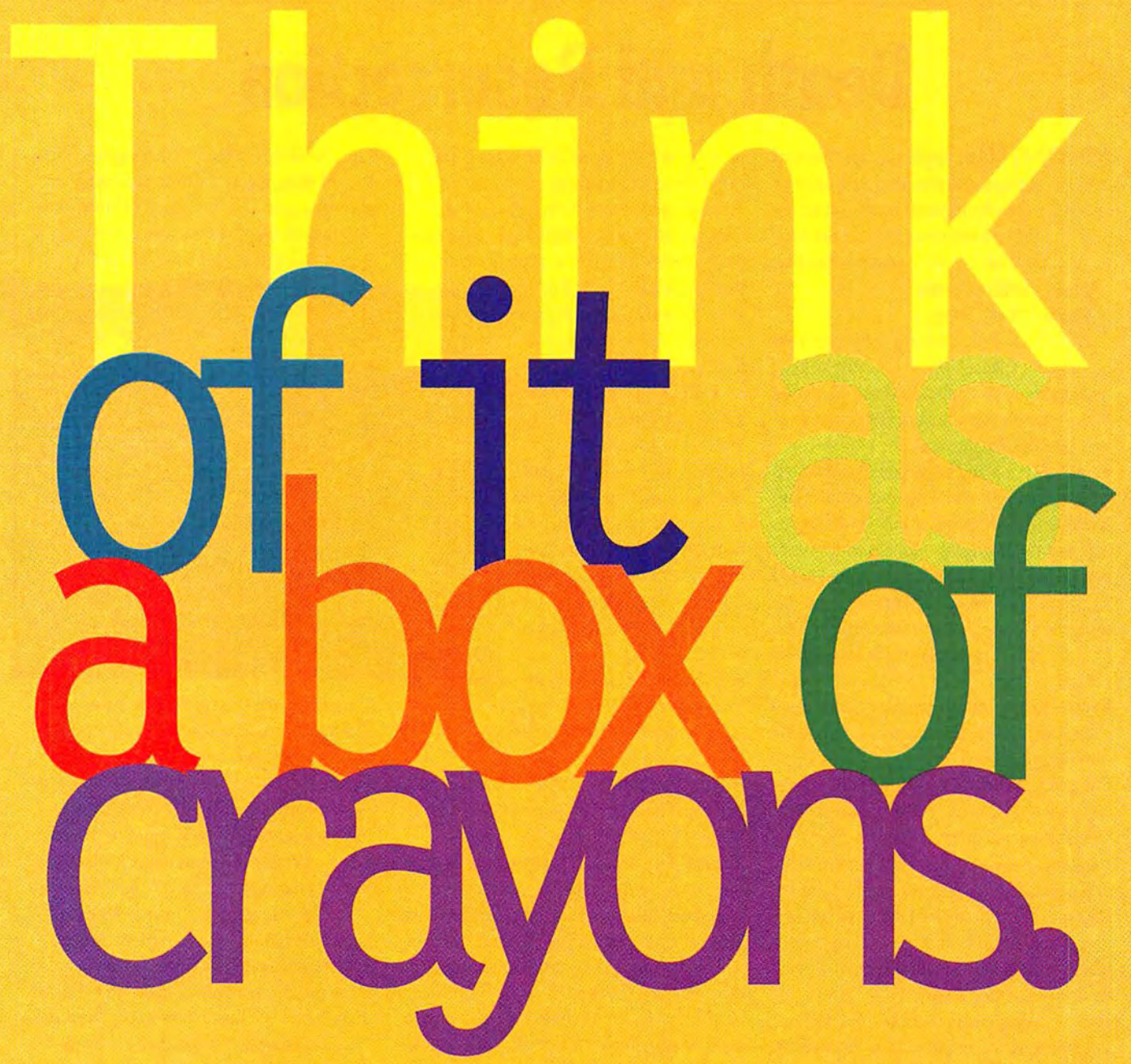
Reason #4: Accountability will at last be placed where it belongs — directly on the engineers' heads. According to Apple Chief Technology Officer Ellen Hancock, releases will be scheduled for twice a year; the first will be in January, followed by another next July. Hancock is deploying engineers into teams to work on mission-critical technologies, making it clear that it is their responsibility to get the work done in time. If their particular component isn't finished by that release's deadline, it will have to wait for the next one, which won't look good on that team's next performance review. The concept of schedule slippage no longer exists in Apple's OS group. This hardheaded competitive approach to OS development may be just the kick in the pants Apple needs.

Are there disadvantages to killing Copland? Sure. Public perception is that Apple's handling of its highly touted next-generation operating system — a.k.a. The Windows Killer — has been inept at best, and canceling the project will appear to be the last nail in the Mac's coffin and will certainly be reported as such by the media. Also, scratching the project may lead to delays, as engineers focus on delivering the easier pieces, putting off the tough jobs for later. To pull off a smooth transition to the new strategy, Apple's management team has to act swiftly and communicate what Mac users should expect in the next OS release.

Careful management of these system updates is also critical. Apple must not succumb to incessant updatitis. Look at what's happened to 7.5.3 — there are now four versions of the same OS. Customers won't stand for 7.8.2.1a, nor are they willing to be nickel-and-dimed for each OS update.

Most of all, Apple has to evangelize this approach to OS development to third-party developers. I didn't hear cries of woe and lamentation from developers when Apple shifted its OS gears — in fact, rejoicing was heard in some quarters — but developers are already working on products for one Mac and two Windows operating systems. Adding more flavors to the Mac OS may leave a bad taste in everyone's mouth.

ILLUSTRATION / JAMES YANG



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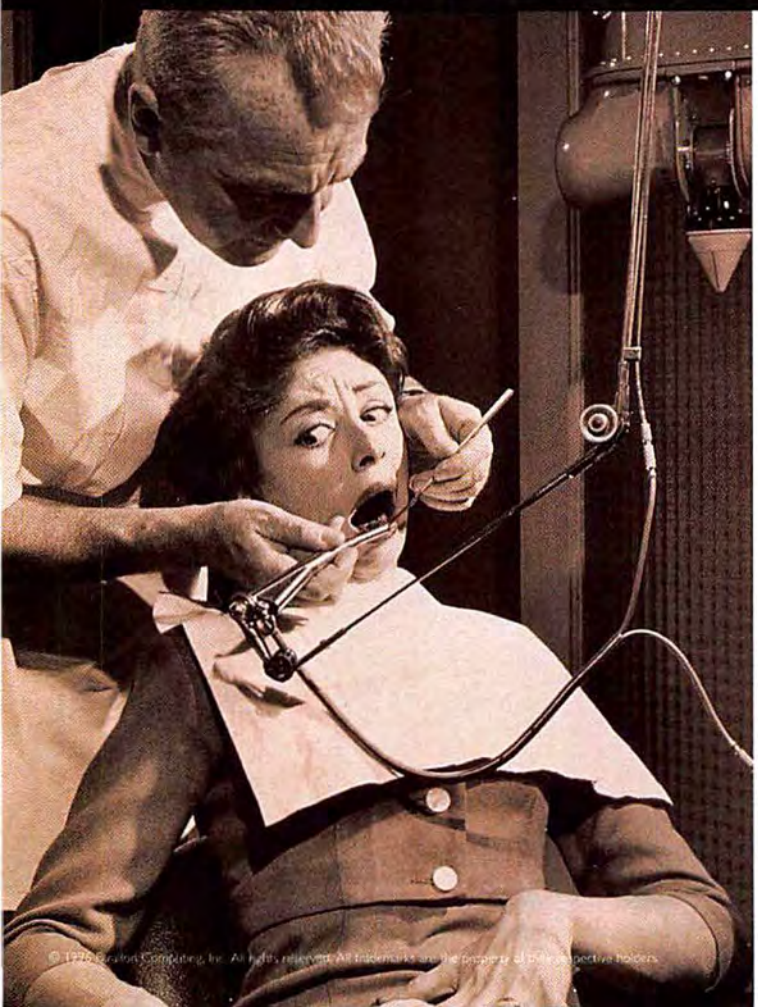

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NEWS

Powerful Changes for PowerPC

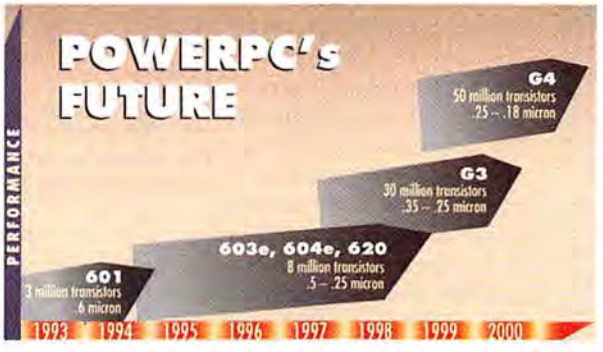
Details are scarce as IBM and Motorola announce plans for future PowerPC microprocessors.

THERE'S IRONY APLENTY in the fact that engineers from IBM and Motorola are the latest to prove the 1979 prediction of Dr. Gordon Moore, cofounder of rival Intel, that microprocessor power would double every 18 months for the foreseeable future. IBM and Motorola's announcement of their next two generations of PowerPC microprocessors — and their hints at a third — keep Moore's Law firmly in effect.

Specific details were scarce in the alliance's announcement. We'll have to wait for product-release target dates, detailed microarchitectural plans, and even the names of the upcoming chips. The overall message, however, is clear: PowerPC microprocessors are about to get faster — a lot faster. What's more, the new processors will run your existing PowerPC-native applications.

Two new generations of microprocessors are in the works, code-named G3 and G4. Of the two, the G3 series will be the less radical departure from the current PowerPC 603e, 604e, and 620 troika. (And, yes, the much vaunted, oft delayed 620 will finally appear in high-end systems in early 1997 — but not in those from Apple.)

The alliance claims we will see G3-series microprocessors in systems — from Apple and others — as early as mid-1997. Performance improvements will be sparked by cache and bus enhancements along with core and microcode tuning specific to the Mac OS and Windows NT, the two operating systems expected to be most commonly used in soon-to-be-released PowerPC Platform systems. In other words, the G3 series is being designed specifically for how it will be used and not merely to perform well on abstract benchmarks. As process technology improves, 400-MHz G3 chips should appear — possibly as early as late 1997, surely during 1998. Expect high-end G3 microprocessors to approximately double the performance of current PowerPC chips.



Although the next two generations of PowerPC microprocessors will be far more complex than the current 603e, 604e, and 620 models, the smaller process size of the new-generation models will enable them to consume little power, remain compact, and be relatively inexpensive.

The G4 series will take a more radical approach. Although G3 PowerPC chips are, at the core, enhanced versions of current models, the G4 series will be entirely new, with advances in superscalability and functional-unit architecture. Designed to match or exceed the performance of Intel's long-awaited Merced microprocessor (née P7), the G4 series is planned for release in late 1998 or early 1999. In addition to new microarchitecture, G4 chips will benefit from process-technology improvements that will allow on-chip circuitry as tiny as .18 micron. This will lead to clock speeds of over 500 MHz and single-chip transistor counts as hefty as 50 million and will keep die size small (and, therefore, per-chip costs low) and power consumption reasonable. Of course, performance estimates for the G4 series are, at this time, a fine balance between engineering projections and wishful thinking, but according to the alliance, it's not unreasonable to expect that G4-series chips will triple or quadruple current PowerPC performance.

Also, the alliance hinted at another major design effort already under way and dubbed Project 2K: a "clean sheet of paper" approach for designing the first new microprocessors of the 21st century — including future 1,000-MHz screamers based on process technologies of under .1 micron. This dedication to the future, the alliance members insist, is not merely pie-in-the-sky marketing — witness their 50-percent ramp-up in engineering investment and their effort to ensure that Windows NT applications are ported to the PowerPC (well over 100 have been so far, and hundreds more are in development).

Dr. Moore was right. / *RIK MYSLEWSKI*

FUTURE TECH

Gigabit Ethernet Dims ATM's Future

"YEAH, SURE, BILL" was the response of most industry observers in 1994 when our favorite boyish billionaire, William Henry Gates III, predicted, "We'll have infinite bandwidth in a decade's time." Today, many of the same pundits are wondering if he just might be proven right — metaphorically speaking, at least.

Although *infinite* may be a mite overstated, networking's immediate future is certainly teeming with high-bandwidth possibilities. The most promising of these has long been thought to be ATM (*asynchronous transfer mode*), a complex but robust networking technology that scales from 25 Mbps (megabits per second) all the way up to multigigabits per second, with 622 Mbps currently the most cost-effective — although still costly — high-bandwidth flavor.

ATM's got a new challenger, however, and one with a familiar name: Ethernet. But don't confuse it with the good ol' 10-Mbps Ethernet on the motherboard of every Mac or even the 100-Mbps variety known as Fast Ethernet. No, this new ultrahigh-bandwidth contender weighs in at a full 1,000 Mbps: Gigabit Ethernet.

Although ATM had a multiyear head start, relatively inexpensive Gigabit Ethernet is quickly gaining the hearts and minds of network planners; many are putting aside ATM plans and instead waiting for Gigabit Ethernet switching hubs and NICs to appear in the next 18 months. Although ATM may still find a home in network backbones, expect Gigabit Ethernet to share the backbone chores as well as rule the cable that plugs into the back of your future Mac. / *RIK MYSLEWSKI*

NEW & NOTABLE

SOFTWARE

QuickMail Pro. Send and receive Internet e-mail with a MIME-compliant POP (Post Office Protocol) mail client from the maker of QuickMail. $69. CE Software: 800-523-7638 or 515-221-1801; http://www.cesoft.com/.

Mathcad Plus 6. This technical-calculation workbook is back after a long hiatus from the Macintosh. It now features easier editing and formatting capabilities and the ability to embed animations in a worksheet and to create links to Mathcad worksheets on the Web. $349. MathSoft: 617-577-1017; http://www.mathsoft.com/.

Timbuktu Pro for Mac 3.0. The latest version of Farallon's collaboration software lets you observe and control other computers over your LAN or via a 14.4-kbps-or-faster modem. $139; upgrades, $19 to $49. 510-814-5000; http://www.farallon.com/.

HTML Grinder 3.0. This collection of Web-site-management tools lets you change an identical piece of text in hundreds of HTML documents at once and examine a Web site for broken links, missing images, and bad HTML syntax. $150. Matterform Media: 505-983-4189; http://www.matterform.com/.

▼ **Drowned God: Conspiracy of the Ages.** Uncover alien conspiracies, meet historical geniuses, and solve riddles of the paranormal in this role-playing adventure game. $49.95. Inscape: 800-693-3253; http://www.inscape.com/.

RealAudio Player Plus. Play real-time audio over the Internet from online radio stations. For PowerPC-based machines only. $29.99. Progressive Networks: 206-447-0567; http://www.RealAudio.com/.

d•Time Mac. Ballard Synergy claims that this utility can make any CD-ROM drive appear to run up to 30 to 50 times faster by caching CD-ROM data on your hard disk. $59.95. 360-598-2456; http://www.ballardsynergy.com/.

The Space Bar. You're a hard-boiled telepathic detective on the trail of a murderous thief in a cheap corner of the galaxy inhabited by extraterrestrial barflies and rogues. $50. Rocket Science Games: 415-442-5000. / *CAROLYN BICKFORD*

FIRST LOOKS

PageMaker 6.5:

Faux Quark

LOYAL PAGEMAKER PROS and online publishers may be pleased with PageMaker 6.5's improved design features when it ships in November, but its new frame-based layout options are unlikely to convert QuarkXPress diehards and may frustrate some PageMaker fans.

Although the design versatility allowed by text and graphics frames is finally part of PageMaker in version 6.5, the program remains a free-form-layout application at heart. Although you can fill a PageMaker keyframe with either text or graphics, using the same Place command you use with free-form layout, you have to go to a separate dialog box under a separate menu item to position, align, or size your text or graphics in the keyframe, and there are no keyboard command equivalents. In fact, because of separate commands unique to its new frame-layout features, PageMaker 6.5 has a dizzying — too dizzying — array of tools and menu-item commands.

On a more positive note, PageMaker 6.5 integrates well with other Adobe programs. If you double-click on a Photoshop or Illustrator file in your layout, PageMaker 6.5 will automatically launch the graphics program and open the original file for editing. PageMaker 6.5 also lets you work with layers and has the same tabbed palettes found in Photoshop.

PageMaker 6.5's Layers and Color options give you precise control over nontextual elements of your page design.

Although the promised HTML features were not yet functional in the beta version we examined, Adobe claims that PageMaker 6.5 will translate your layout into an HTML page with tables and will automatically convert images to GIF or JPEG. Also, a new hyperlinking palette will let you easily create links within your document or to Web sites. / *CAROLYN BICKFORD*

PROS: Layers, tabbed palettes, and improved HTML conversion are welcome additions.
CONS: Frame-based layout options are awkward and poorly integrated.
INFO: $895. Adobe Systems, Mountain View, CA; 800-422-2623 or 206-622-5500; http://www.adobe.com/.

Cram More RAM Sans SIMMs, DIMMs

FOOL YOUR MAC into thinking it has more RAM than ever before, by choosing between two memory-optimization schemes. The first is an upgrade to a proven favorite, the second an inexpensive utility given a second chance by a company with a murky past.

Connectix — developer of the popular RAM Doubler, among other improvements to the Mac OS — has squeezed even more out of its compression technology. With RAM Doubler 2, you can now *triple* your available RAM. RAM Doubler 2 also adds a new control panel that features a slider to tell it how much expanded memory you really need and provides dynamically updated RAM-usage info. $99. 800-950-5880 or 415-571-5100; http://www.connectix.com/.

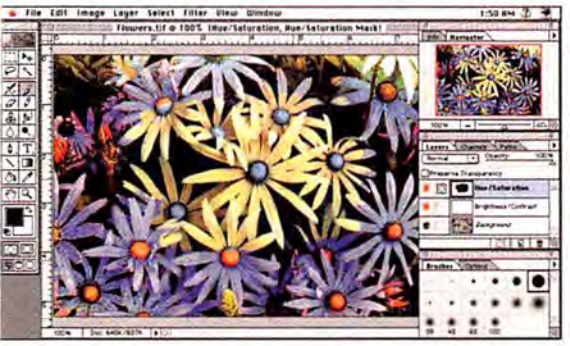
Syncronys RAM Charger 3, a $39 memory-optimization utility, automatically opens applications at their minimum memory-allocation setting and allocates more to them as they need it. (You can exclude incompatible applications.) RAM Charger 3 was formerly available from tried-and-true Macintosh stalwart Jump Software — a respectable provenance that may save its new owner, Syncronys, from last year's well-deserved embarrassment: The company had to recall its SoftRAM95, a Wintel-compatible memory-management utility, after the Federal Trade Commission opened a consumer-fraud inquiry amid reports that the product did not work with Windows 95, as advertised. 310-842-9203; http://www.syncronys.com/. / *CAROLYN BICKFORD*

Photoshop 4.0:
All Your Wishes Won't Come True

PHOTOSHOP USERS AGREE that high on the wish list for the popular image editor's next version are multiple undos and lighter RAM requirements. Photoshop 4.0, expected to ship this fall, for $895, won't fulfill those desires — and neither does version 4.0 improve Photoshop's color-separation abilities. However, our look at a beta version did uncover some new features that will make the application easier — and snappier — to use.

PROS: Many tasks easier and speedier. Layers for color adjustments add creative possibilities.
CONS: The wait for multiple undos, lighter RAM demands, and improved color-separation tools continues.
INFO: $895; upgrade, $149. Adobe Systems, Mountain View, CA; 800-833-6687 or 206-628-2749; http://www.adobe.com/.

Photoshop 4.0 takes layers to a new level by adding ones specifically for tonal and color correction. Without multiple undos, this adds a safety net for experimentation. To create an "adjustment layer," you pick the modification — such as Levels, Curves, Posterize, Brightness/Contrast — and then try effects without permanently affecting your image. You could, for example, create a Brightness/Contrast layer and paint shadows and highlights.



Photoshop 4.0's new color- and tonal-adjustment layers let you paint modifications onto an image without permanently affecting the underlying pixels.

You will also enjoy Photoshop 4.0's new guides and grids; a navigator palette much like Extensis' freeware PhotoNavigator; zoom levels controlled by a slider; and a free-transform function that lets you stretch, rotate, and scale objects — all before you commit.

Another frequent user request has been for scripting that automates regular tasks. *This* wish Adobe grants, with a new Action palette. You can record actions, add dialog boxes for custom steps, and apply these macros to a batch of images. Using the palette is intuitive, but the palette is based on its own scripting language — without support for AppleScript, you don't have the flexibility to automate tasks across programs. Adobe's automation solution is helpful but incomplete.

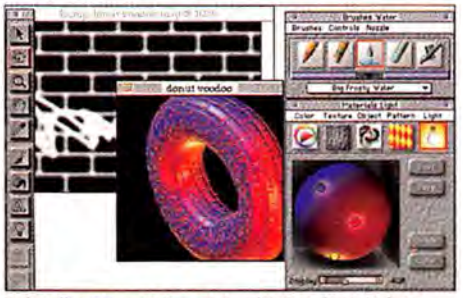
The beta version we looked at was quite zippy but still required a lot of RAM for best performance — we recommend 5 MB of RAM for every 1 MB in your image. */ SCHOLLE SAWYER*

New Apps Help Mac Keep Graphics Edge

DOOMSAYERS WHINE that the hottest applications no longer appear first on the Mac. Not so in the fast-paced graphics market: A new 3-D tool from Fractal will ship a month before its Wintel counterpart, and the Mac and Windows versions of an improved 2-D favorite from Macromedia will be released concurrently.

Fractal Design's Detailer breaks new ground, by letting you paint directly on 3-D models. The program serves up a mix of Painter-like tools (including the graphics-spitting Image Hose) and 3-D essentials such as editable lights. You can edit bump, texture, reflection, glow, and highlight maps in individual windows or paint on objects, using "natural media" tools such as dodge and burn, watercolor, liquid brushes, and so on.

Detailer imports native files from Ray Dream Studio and Designer as well as 3DMF (3-D metafile format) files from other 3-D programs. You can manipulate 3-D objects in real time within Detailer instead of toggling between 2-D and 3-D apps. And 2-D artists can edit 3-D Detailer primitives to add 3-D elements to their compositions. $449. 800-297-2665 or 403-688-5300; http://www.fractal.com/.



Paint directly on 3-D models with Detailer's Painter-like brushes. A comprehensive lighting palette provides dynamic control over colors and shadows.

Macromedia's latest contribution to the Macintosh-graphics arsenal, FreeHand 7.0, raises the stakes against Adobe Illustrator 6.0. Version 7.0 boasts an improved interface, Macintosh Drag and Drop from Photoshop and PageMill, and support for GIF and JPEG files. FreeHand 7.0 additionally offers improved color-management tools and printing aids such as draft-mode printing and print-settings style sheets — these come in handy when you're using various service bureaus. $399; upgrade, $149. 800-457-1774 or 415-252-9080; http://www.macromedia.com/. */ BROOKE C. WHEELER*

IN BRIEF

AOL's Late but Forgiven

MERCILESSLY NEGLECTFUL of its Mac supporters for too long, America Online has finally come up with a sincere apology: AOL 3.0 for the Mac.

This new version of the leading online-service-access software has a new Smart Art feature that does away with the dreaded Adding Artwork progress bar, a snazzier interface, new e-mail goodies such as Buddy Lists, and integration with Microsoft's Internet Explorer Web browser. Download free from AOL. 800-827-6364 or 703-448-8700; http://www.aol.com/. */ BROOKE C. WHEELER*

Videoconferencing Gets Real

IT'LL BE EASIER than ever to set up a low-end videoconferencing link this fall, when Apple releases version 1.5 of its QuickTime Conferencing (QTC) software — and if you want better performance, there's an ISDN PCI card option.

For $49.95, you can get the QTC 1.5 software and then use a camcorder as input for videoconferencing over the Internet via a 28.8-kbps modem. The QTC 1.5 ISDN kit (price not set at press time) features a PCI card with built-in H.320-standard video compression/decompression. */ KAREN J. OHLSON*

It's for Your Own Good

YOU'RE TOO HONEST to bootleg a DVD-based copy of *Independence Day,* aren't you? Well, the folks creating DVD, the Next Big Thing in digital-video storage and distribution, will save you from temptation.

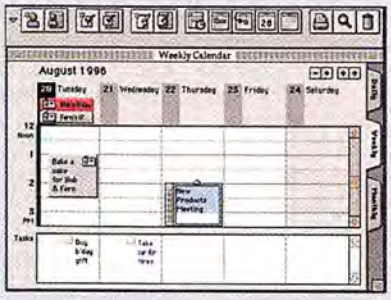
Although DVD drives such as the new DVD-A300 and DVD-A100, from Panasonic, are able to read a feature film's worth of data from a two-layer, 4.7-GB disc, a Panasonic source says that the first *recordable* DVDs, slated for release in 1998, are going to be based on single-layer technology and will hold far less data — possibly as little as 2.6 GB — thus subverting easy video piracy. Panasonic: 800-742-8086 or 201-348-7000. */ RIK MYSLEWSKI*

NEW & NOTABLE

SOFTWARE

Ray Dream Studio 4.1. This Internet-savvy update includes support for Apple's QuickDraw 3D format (3DMF) and GIF and JPEG file formats. Also new is a direct VRML export filter, visible motion paths, and a SuperMesh geometry extension that lets you create organic-looking primitives. $499 (free to owners of 4.0). Fractal Design: 408-688-5300; http://www.fractal.com/.

▼ **Claris Organizer 2.0.** The latest version of this popular PIM adds instant e-mail and Web links, redesigned contact management, and



drag-and-drop linking to an improved interface. You can also customize your work environment by choosing from 15 background Decors. $69. Claris: 408-987-7000; http://www.claris.com/.

Ascend 4.0. An improved interface serves up new features such as Timer, which tracks your time management, and Speed Dial. You can also now link tasks and appointments to contacts and navigate more easily via floating tool bars and pop-up menus. $99.95. Franklin Quest: 801-975-1776; http://www.franklinquest.com/.

Meet-Me Light. For those who already have an ISDN connection, this H.320 video-conferencing software for the Power Mac delivers a host of features less expensively than hardware alternatives. Meet-Me lets you dial out, track incoming calls, and return calls, with a mouse click. $299. Sagem: 408-446-8690; http://www.satusa.com/.

PageStream 3.2. An update for this desktop-publishing program, which combines illustration and page-layout tools, includes a new Mask feature that lets you draw custom masks of any shape or create them automatically for images on white backgrounds. Also new are an eyedropper, a pasteboard, and a configurable toolbox. $595. SoftLogik: 800-829-8608 or 314-256-9595; http://www.softlogik.com/.

Landscape Architect. Before you start digging, experiment with landscaping ideas and create test 3-D walk-throughs with more than 1,500 landscape symbols. $30. SoftKey: 800-227-5609 or 510-792-2101. / *BROOKE C. WHEELER*

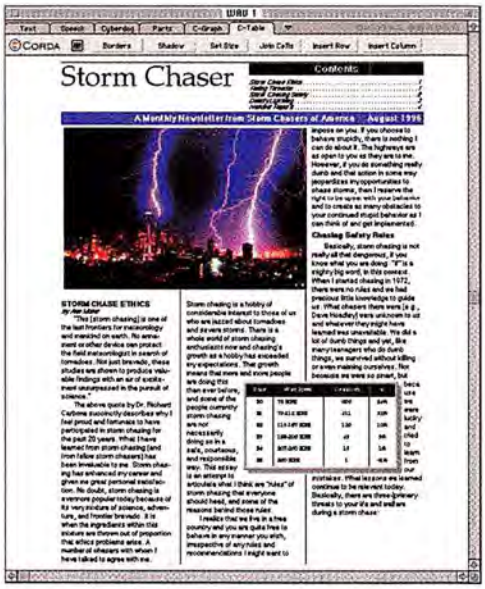
FIRST LOOKS

WAV: The First Live Object for Word Processing

BIG CHANGES ARE UNDER WAY as OpenDoc gains momentum. It's time to take a close look at that monolithic productivity-application suite that's hogging all your hardware and decide if your work could be done more efficiently with a simple set of OpenDoc Live Objects (the software components formerly known as OpenDoc parts).

Digital Harbor wants to help. It's offering a promising Live Object called WAV, an elegant word processor that's full of useful features such as fast, on-the-fly text wrapping; cursors that automatically adopt the style of the text they're in; and the ability to enter text anywhere on an empty page, without starting at the margins.

Although WAV is missing several features available in stand-alone word processors — most notably style sheets and a word-count function — you'll be able to add these features and customize WAV to work the way you do by adding other Live Objects. And although Live Objects for all these functions aren't yet available, WAV's support for existing ones was seamless in the version we previewed. A third-party Live Object spelling checker worked fine, appearing as a menu-bar item alongside built-in WAV features. Similarly, a graph-building Live Object was instantly accessible from the FolderBay — a tabbed parts dock atop WAV's main work window.



To tailor Digital Harbor's elegant word processor/OpenDoc container to your needs, simply add the Live Objects of your choice.

PROS: Inexpensive. Flexible. Serves as a Live Object container and/or part.
CONS: Depends on third-party Live Objects for some top-class word-processing features.
INFO: $49. Digital Harbor: 801-785-2115; http://www.dharbor.com/.

Because of its dependence on OpenDoc, WAV will require 8 MB of free RAM; if you use RAM-hungry Live Objects such as Cyberdog, you'll need even more. When it ships this fall, WAV will be a bargain, at $49. A major factor in its success, however, will be the cost and availability of other useful Live Objects. / *CAROLYN BICKFORD*

Two New Technologies Make Mac Music

MUSIC EDITING AND PERFORMANCE have long been areas that require expert skills. With the advance of two emerging technologies, however, mere mortals may soon be able to take a more active role in the musical process.

Headspace, a company cofounded by musician/composer Thomas Dolby, has released its Rich Music Format (RMF) technology. RMF is a proposed cross-platform standard that allows multimedia producers to incorporate multiple MIDI and digital-audio files within a single file that is far smaller than traditional audio files. Included in RMF is run-time control over such elements as tempo, transposition, mix, and instrumentation — a boon for those who want to tweak digital-audio as well as MIDI files. WebTV, a TV-based hardware Internet system, has already licensed RMF for delivery of its audio content. 415-696-9400; http://www.headspace.com/doc/rmf-whitepaper.html.

Bringing even more interactivity to musical poseurs is Virtual Music Entertainment. Using the company's proprietary technology built into the VPick ($9.95) and Virtual Guitar ($49.95) game controllers, users with no more musical skill than a broad sense of rhythm will be able to jam along with their favorite rock bands in a series of interactive games developed and marketed in conjunction with BMG Interactive. Expect these games to hit the stage late in 1996. 800-400-1229; http://www.virtualmusic.com/. / *CHRISTOPHER BREEN*

Adobe PageMill 2.0:
Power Pages

THE WEB IS EVOLVING at breakneck speed — and in the case of Web authoring tools, things are moving so fast that in the ten months since PageMill 1.0 was released, Adobe has added so many new features that version 2.0 makes version 1.0 look like SimpleText.

Most useful in the soon-to-be-released PageMill 2.0 are features that facilitate the design of visually striking pages. With version 2.0, you can wrap text around graphics, use HTML tables to both present tabular data and create snazzy page layouts, and embed image-map hyperlinks — all through PageMill's expanded tool bar. Creating a table and inserting and deleting rows and columns are quick click-and-drag operations, and it's a snap to make one table cell span multiple rows and columns.

PageMill 2.0 also adds support for frames, and — unlike Claris Home Page — PageMill 2.0 lets authors create and edit framed pages within the frames themselves, instead of forcing them to define their frame sets in one window and then edit the framed pages one by one.

PageMill 2.0's support for Netscape's plug-in architecture is unique among Web authoring tools. Simply drop a Netscape plug-in into PageMill's Browser Plug-Ins folder, and you'll not only be able to drag and drop plug-in multimedia files such as QuickTime movies and Shockwave presentations right into PageMill but PageMill will even display them right in the PageMill window.

PageMill 2.0 allows users to graphically edit frames as well as tables.

There are, however, some features missing from this otherwise impressive upgrade: PageMill 2.0 doesn't let you apply fonts to text and doesn't let you color the cells of tables, features supported by both Microsoft's Internet Explorer and Netscape Navigator. Neither can you automatically upload files to a remote Web server. */ JASON SNELL*

PROS: Intuitive table editing and editable frames editor.
CONS: Still fails to support a few popular HTML extensions; no auto-upload features.
INFO: $99. Adobe: 800-623-2320 or 415-961-4400; http://www.adobe.com/.

IN BRIEF

Taming the Paper Tiger

IF YOU'RE BURIED in an avalanche of paper, consider a document-management system that will turn scanned documents into indexed, quickly retrievable archives. You'll save precious time — and we all know what time equals, don't we?

If your business is a small one, take a look at Second Glance's $169 e•paper, which uses Xerox's TextBridge software for optical character recognition and links to printers, fax modems, and e-mail. If you're responsible for a large corporate site, look to Blueridge Technologies' full-featured Optix system, which now — thanks to AppleScript support — can tie into most Mac business programs. Pricing, including server and cross-platform client software, installation, training, and tech support, starts at $60,000. Second Glance: 800-682-3110 or 360-692-9763. Blueridge Technologies: 540-675-3015; http://www.blueridge.com/. */ CAROLYN BICKFORD*

Lasso Your Data

IT'S GETTING EASIER to provide Web access to your FileMaker Pro database. Instead of making you tinker with database queries and HTML code, Web CGI (Common Gateway Interface) packages such as Blue World's Lasso allow you to create interfaces by using graphical HTML authoring tools such as Adobe PageMill or Claris Home Page.

Lasso serves FileMaker Pro database content via the Web and is compatible with all current Mac-based Web-server software. Using an authoring tool and Lasso's custom HTML tags, you can prepare a FileMaker file for Web access without altering the database itself. Lasso Lite, a limited version of Lasso, is available free from the Blue World Web site. Pricing for full-strength Lasso had not been set at press time. Blue World Communications: 206-313-1051; http://www.blueworld.com/. */ SHELLY BRISBIN*

Adobe Aims Persuasion 4.0 at the Web

PAPER IS NOT ENOUGH anymore — and neither are colorful slides or animated screens. If you're in the information-presentation business, you need to be able to tell your story on the World Wide Web. Nobody understands this better than Adobe, the publishing-software powerhouse that's leveraging its expertise onto the Internet.

The latest Adobe product to get on the Net is Adobe Persuasion 4.0. In its previous incarnation as Aldus Persuasion, it earned a reputation for being powerful and full-featured, although not for the faint of heart. In this, its first Adobe-designed release, Persuasion 4.0 maintains its professional power while adding multimedia Web authoring capabilities — but whether it's more user-friendly remains to be seen.

Persuasion 4.0's new Layers palette matches those in Photoshop and Illustrator.

The new Internet AutoTemplate feature is one attempt to make the Web authoring capabilities of Persuasion 4.0 easy to use. Like the previous AutoTemplates, for slides and overheads, the Internet AutoTemplate has coordinated colors, backgrounds, buttons, and other layout elements. Whether or not you use the AutoTemplate feature, you can deliver your presentation via the Web by exporting it as an Adobe Portable Document Format (PDF) file, readable by Adobe Acrobat and most popular Web browsers, including Netscape Navigator and Microsoft's Internet Explorer.

Persuasion 4.0's usability should also benefit from Adobe's intention to standardize interface design among its products. For example, Persuasion's new Layers palette matches those found in Photoshop and Illustrator and many keyboard command equivalents have been changed to match those in other Adobe software. In addition, you can now drag and drop graphics, movies, sounds, and even URLs directly into Persuasion layouts.

Although Persuasion 4.0's improved usability may remain in question, the product's improved purchasability isn't: For $395 you receive a CD-ROM with *two* fully licensed versions — one for the Mac OS and one for Windows 95. Such a deal. */ RIK MYSLEWSKI*

NEW & NOTABLE

HARDWARE

▼ **Apple Color OneScanner 1200/30.** This 600-x-1,200-dpi color flatbed scanner includes a special version of Xerox's TextBridge 3.0, for converting a scanned page directly into HTML, as well as OneScanner Dispatch 2.0, for quick scanning, editing, printing, faxing, and more. $849. 800-538-9696 or 408-996-1010.

Avid Technology MCXpress. Use your PCI-equipped Mac to composite broadcast-quality video and sophisticated special effects with this hardware/software digital-video and four-track audio-editing system. $14,995. 800-949-2843 or 508-640-6789.

Tektronix Phaser 350. This solid-ink color printer provides output in the same class as color laser printers, but with a six-page-per-minute engine speed, it's considerably faster — not to mention cheaper. $3,495. 800-835-6100 or 503-682-7377; http://www.tek.com/Color_Printers/.

Plasmon Data Afterburner. Burn your own CDs with this inexpensive CD-R drive/software bundle that also reads CD-ROMs at 4x speed. $699. 800-445-9400 or 408-474-0100; http://www.plasmon.com/.

Cambridge SoundWorks MicroWorks. The two 4-x-4-inch satellite speakers and a 17.5-inch-high, 9-inch-wide subwoofer deliver rich sound from your multimedia programs. $349. 800-367-4434 or 617-332-5936.

Polaroid SprintScan 35 Plus. Digitally sample images from film negatives or prints at up to 2,700 dpi and 12 bits per color with this slide scanner. $2,595. 800-816-2611; http://www.polaroid.com/.

Nakamichi NJ-4.8s. This slim internal 8x CD-ROM changer gives you online access to four discs at once. $549. 310-538-8150; http://www.nakamichicdrom.com/.

Panasonic MLP-1000. Project 640-x-480-pixel images onto screens as big as 25 feet (diagonally), using this 21-pound projector with built-in speakers. $6,999. 800-742-8086 or 201-742-8086; http://www.panasonic.com/.

3M MP8030 Multimedia Projector. You can adjust your projected 640-x-480-pixel images with the remote control that ships with this 24-pound projector. $8,495. 800-328-1371 or 512-984-7138; http://www.mmm.com/product/opunits.html#vsd. / *CAROLYN BICKFORD*

Where WebSTAR Goes, Others Will Follow

Internet-server-software developers to borrow WebSTAR's powerful plug-in technology to challenge WebSTAR's dominance.

PC AND UNIX BIGOTS may give Mac Internet-server software a bad rap, but their carping doesn't seem to bother the companies lining up to challenge Quarterdeck's market-leading WebSTAR for the hearts and minds of Mac Webmasters. BBS-software maker ResNova and hardware specialist Sonic Systems each have new Web-server-software offerings, and both firms will include support for WebSTAR's new plug-in architecture — ResNova immediately and Sonic before the end of the year.

ResNova's Boulevard server begins with an aggressive ($395) price tag and adds support for CGIs, built-in image-map processing, server push, and server includes (which can create Web pages on the fly). ResNova also announced Web For One, a $39 personal Web server that also supports CGIs and plug-ins. (Quarterdeck is slated to offer a personal version of WebSTAR as well.) ResNova: 510-548-4561; http://www.resnova.com/.

Sonic's Web software is one of the firm's five new Internet Access Server applications. The other four provide e-mail, FTP, DNS, and DHCP (a system for dynamically allocating IP addresses to devices as they connect to a network). Each server application is priced at $495, with additional packages available for $199 each; if you purchase all five apps at once, the price is $999. Sonic: 800-535-0725 or 408-736-1900; http://www.sonicsys.com/.

Meanwhile, most top CGI vendors, including Maxum and Everyware Development, are busily converting their offerings into WebSTAR plug-ins. A host of new plug-ins from a broad range of Net-savvy vendors is also appearing, including WebSiphon ($495), from Parity Software (512-328-2288; http://www.parity.com/), which serves HTML pages dynamically, caches files, and processes forms. WebDetour ($149), from Acme Technology (203-857-0631; http://looney.acmetech.com/at/), uses a database to redirect Web-page requests. A Java plug-in from Natural Intelligence runs Java applets on the server and will be included with WebSTAR 2.0. Quarterdeck (800-525-2580 or 510-649-4949; http://www.starnine.com/) and a few new players will add new server tools, most of which will be available before WebSTAR 2.0 ships this fall. / *SHELLY BRISBIN*

In Pursuit of Prospects and Profits

WHY PAY FOR a one-size-fits-all mailing list when you can fine-tune your own prospects list? The quarterly-updated D&B MarketPlace has more than 10 million detailed Dun & Bradstreet business listings you can narrow down into a mailing list by business type, size, location, and more. You can limit addresses to headquarters, create cross-tabbed analyses, and print POSTNET bar codes on mailing labels. For the $599 street price, you can research your prospects in detail and create a mailing or telemarketing list of up to 3,000 businesses; you can then purchase credits at $500 per 5,000 for more names on your list. MarketPlace Information: 800-999-9497 or 617-672-9200; http://www.mktplace.com/.

If you don't need detailed marketing analyses, you might be able to make do with electronic telephone directories such as Pro CD's $99 Select Phone or Digital Directory Assistance's $59 Business Pro, both of which can locate businesses by city and business type. Or you can simply tune your Web browser to online business directories such as Big Yellow (http://www.bigyellow.com/) and Zip2 (http://www.zip2.com/). Zip2 can even give you a map and directions to a prospective client. Pro CD: 800-992-3766 or 415-329-8401. Digital Directory Assistance: 800-284-8353 or 617-639-2900; http://www.dda-inc.com/. / *CAROLYN BICKFORD*

When it's time for a face-to-face meeting with a prospective client, use Zip2 for a map and directions.

NET.CETERA

Microsoft, Netscape Working Double Time

GREAT CHESS MATCHES require that you plot strategy several moves ahead. Microsoft and Netscape are proving that the browser wars require the same forethought.

NETSCAPE. Netscape has two separate development teams, one working on Navigator 3.0 and the other on Navigator 4.0, which will support a slew of new HTML tags, including a tag that will let Web-page authors create HTML code that can open multiple windows on a user's Web browser. Also look for HTML-style-sheet support and better font control. In addition, Navigator 4.0 will be able to automatically detect pages with embedded plug-ins, determine if you have that plug-in, and automatically download and install it if necessary.

Most exciting for Mac users is Netscape's move to OpenDoc. Users of Cyberdog — Apple's Internet-access OpenDoc suite — will be able to choose Navigator as their main HTML browser and will presumably be able to choose other Cyberdog parts for FTP access, newsreading, and e-mail.

MICROSOFT. Version 3.0 of Microsoft Internet Explorer for the Mac will feature support for HTML style sheets; Java; and ActiveX, an OLE-based technology that is Microsoft's answer to Netscape plug-ins. Although OLE is notoriously RAM-hungry, Internet Explorer will require only a 60K extension in order to use ActiveX and the extension will load only when the browser encounters an ActiveX-enabled page.

On slate for next year is — you guessed it — Internet Explorer 4.0. The Wintel version will be integrated with Windows 95, essentially replacing Windows 95's *shell* (the equivalent of the Mac's Finder). Version 4.0 will add the ability to display live "channels" of information (à la PointCast), such as stock tickers and other useful data. Microsoft insists that it will provide a Mac version of Explorer 4.0 — but promises not to replace the Finder in the process. / *JASON SNELL*

Internet Explorer 3.0 will include a newsreader (shown here) based on John Norstad's ever popular shareware gem NewsWatcher.

IN BRIEF

Defend Your Rights

DIGITAL-IMAGE THEFT from the Internet makes reliable digital copyright protection essential. New technology can now embed imperceptible serial numbers into image data without degrading image quality. This *digital watermark*, which survives file modifications, can lead you back to the original artist via serial-number registries.

Using Adobe Photoshop is one way to access this safeguard. Photoshop 4.0 includes Digimarc's Imagemarc digital watermarking and a hyperlink to the Digimarc Web site, from which you can access artist information. Digimarc: 503-626-8811; http://www.teleport.com/~digimarc/. Owners of earlier versions of Photoshop can use HighWater FBI's FBI Writer ($395) and FBI Detector (freeware) for the same level of protection. HighWater FBI: 603-669-7456; http://www.highwaterfbi.com/. / *BROOKE C. WHEELER*

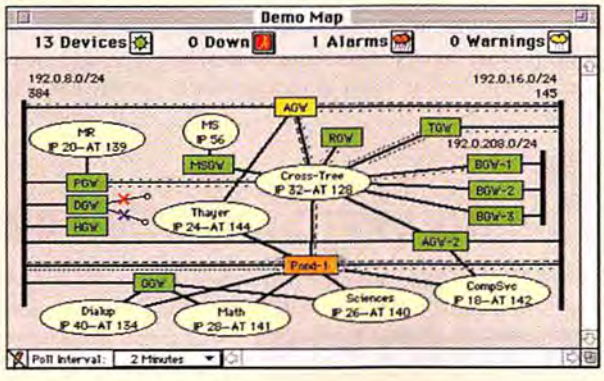
Practice Safe Surfing

ONLINE CONNECTIONS are vulnerable to disruption from many sources, but two new devices provide telecommunications insurance. Panamax's Modemmax filters your AC lines to eliminate electromagnetic and radio-frequency interference that can hinder peak-speed data transfers over your phone line. It also protects computer equipment from power spikes and surges over phone and power lines. $99. Panamax: 800-472-5555 or 415-499-3900; http://www.hooked.net/panamax/.

ORA Electronics' RedGuard locks out telephone extensions on your modem/fax line while the link is in use, thus preventing accidental disruption of your connection. $24.95 (three units per pack). ORA Electronics: 818-772-2700; http://www.orausa.com/. / *BROOKE C. WHEELER*

The Geek Beat

NETWORK MANAGEMENT ▶. InterMapper ($795; $395 for educational customers) creates graphical maps of multiprotocol networks and can send problem notifications by e-mail or pager. Dartmouth Software Development: 603-646-2643; http://www.dartmouth.edu/netsoftware/. File Scripter is a utility for NetOctopus (a network-management and file-distribution application from DataWatch) that uses a Finder-like interface to create file-distribution scripts. File Scripter's pricing — like that of NetOctopus — is on a per-client basis: $5 per client if you've bought DataWatch's annual maintenance service; $2 per client if you haven't. DataWatch: 508-988-9700; http://www.datawatch.com/.



CROSS-PLATFORM. PC MacLAN for Windows 95 (formerly PC MacLAN Connect) adds long-filename and Network Neighborhood support to Miramar's Windows-to-Mac file-sharing application. Miramar Systems: 800-862-2526 or 805-966-2432; http://www.miramarsys.com/.

INTERNET. Newstand is billed as the first Mac-based NNTP (Network News Transfer Protocol) server software. Newstand uses EveryWare Development's Butler SQL to store news articles as database records. $950; with Butler SQL, $1,100. Imagina: 503-224-8522; http://www.imagina.com/. LogDoor ($179 through November 1, $249 thereafter), from Open Door Networks, manages logs for multiple Web sites on a server and processes these logs in real time. 800-480-3667 or 541-488-4127; http://www.opendoor.com/.

NETWORK HARDWARE. Transware's InterTalk MP Ethernet-Ethernet router ($1,499) can speak AppleTalk, TCP/IP, and DECnet. 800-999-6387 or 415-903-2300; http://www.transware.com/transware/. Apple Network Server users can now use Silicon Valley Bus' MultiPort/PCI cards to add four serial ports and a parallel port to the UNIX-based machines. There's also a Power Mac-compatible version. Each sells for $399. Silicon Valley Bus: 408-623-2300; http://www.svbus.com/.

E-MAIL. Mercury Software has created a family of PowerTalk e-mail gateways that support MCI Mail, AT&T Mail, and Bell Canada's Envoy. Since e-mail providers will distribute the appropriate gateway free to their Mac customers, contact your provider for more information. / *SHELLY BRISBIN*

NEW & NOTABLE

RESOURCES

▼ **ObjectGear Volume 3 — Clay Buffet.** Rendered in neon-hued clay: fruits and vegetables, burgers and fries, available in the form of 300-dpi RGB TIFF files. $99.99. Image Club Graphics: 800-661-9410 or 403-262-8008; http://www.imageclub.com/.

Auria Multimedia Music Library Volume I. World, contemporary-instrumental, and dance-music files are among the 60 minutes of license-free WAV music clips that Mac users can convert to AIFF, using an included utility. $89.95. Gira Sound: 800-519-3426 or 303-780-9174; http://www.auriasound.com/auria/.

FingerType. With this XTension, you can apply most of the character and paragraph attributes available in QuarkXPress to a range of text you select as you hold down the mouse button. $99. XChange: 800-788-7557 or 415-864-7592.

HVS Color. This convenient Photoshop plug-in converts 24-bit-color images to 8-bit-color images that look good and download quickly as Web-page elements. $99. Digital Frontiers: 800-328-7789 or 847-328-0880; http://www.digfrontiers.com/.

Learn HTML on the Macintosh. This information-packed primer for HTML 2.0 covers everything from how to create hyperlinks to how to make tables and frames, and it includes a CD-ROM containing BBEdit Lite. $29.95. Addison-Wesley: 800-822-6339 or 617-944-3700; http://www.aw.com/devpress/.

Learn Java on the Macintosh. You don't need a programming background to make Java applets if you have this Java tutorial, which includes a CD-ROM containing Metrowerks' CodeWarrior Java Environment. $34.95. Addison-Wesley: 800-822-6339 or 617-944-3700; http://www.aw.com/devpress/.

Creating Killer Web Sites. Author David Siegel covers the subtler aspects and aesthetics of Web-site design, including preparing images, making Web pages modem-friendly, constructing nested tables, and creating PDF files. $45. Hayden Books: 317-581-3500; http://www.mcp.com/hayden/.

The Underground Guide to Color Printers. *PC Magazine* Contributing Editor M. David Stone shows you how to get the best output for each job. $24.95. Addison-Wesley: 800-822-6339 or 617-944-3700; http://www.aw.com/devpress/.

/ CAROLYN BICKFORD

From the Sandbox to Cyberspace

New Web-page-design software and access-restriction services help your kids have good, clean, wholesome Internet fun.

WHEN YOU WERE A KID, which would you have preferred: making millions of other kids all over the world think you were cool or having unlimited instantaneous access to scads of stuff your folks didn't want you to see? In those days, the question would've been mere daydreaming, but to today's Internet-savvy kids, it's real.

It's a safe bet that today's parents would prefer that their kids pick the first fantasy. Luckily, it's easy to steer them in that direction: Just arm your kids with Vividus' new Web Workshop, with which they can make their own custom Web pages that are accessible to youngsters from down the block to Tierra del Fuego. Then protect the little dears from the Internet's seamier side by using access-control software or your online service's parental-control features.

Kids can use Vividus' simple Web Workshop Web-page designer to create their own lively Web pages.

At its most basic level, Web Workshop is similar to Brøderbund's acclaimed Kid Pix: Kids choose a background and then add their own words, drawings, and even brief sounds, using a set of basic tools. Unlike Kid Pix, however, Web Workshop also has a library of Web links that kids can add to their creations. When a project is done, a single command exports it as a Web page directly onto a Web server. $29.95. Vividus: 415-321-2221; http://www.vividus.com/.

Using SurfWatch Software's SurfWatch or MicroSystem's Cyber Patrol, you can restrict your kids' access to smut on the Web. Both packages block Internet access to sites with sexually explicit themes, let you add sites that *you* deem off-limits, and have regular updates of their lists of restricted sites. Major commercial online services, such as America Online and CompuServe, have parental-control settings that can restrict children's access to adult-oriented newsgroups but not to explicit pages on the Web. Cyber Patrol works with CompuServe's Internet-access service and is free to the service's members. SurfWatch: $49.95; monthly update, $5.95. SurfWatch Software: 800-458-6600 or 415-948-9500; http://www.surfwatch.com/. Cyber Patrol: $49.95; six-month update subscription, $19.95. MicroSystems: 800-489-2001 or 508-879-9000; http://www.microsys.com/CYBER/.

/ CAROLYN BICKFORD

THE OFF BEAT

The Starving Student's PowerBook

IF YOU'RE TOO CHEAP to provide your student children with PowerBooks, you might be able to deflect their accusations of child neglect with an AlphaSmart Pro. Not only is this keyboard-sized note taker a tenth the price of a PowerBook but it will also run for 200 hours before you have to change its two AA batteries, demonstrating logarithmically better endurance than that of battery-devouring PowerBooks.

The AlphaSmart Pro has room for 64 pages of text in as many as eight files, and its LCD panel lets you view four 40-character lines of text. Transferring text into a Mac is a simple matter of connecting a serial cable and hitting the keyboard's Send key. It's a bit pricey, at $299, but educational discounts may bring that down to below $200. Intelligent Peripheral Devices: 408-252-9400. */ NANCY PETERSON*

PHOTOGRAPHY / TOM UPTON

Free Internet News and Stock Reports

Screen-saver news service gives you only the news you choose.

YOU NO LONGER have to sit through an hour's worth of happy talk from blow-dried television anchors, waiting for the one tidbit of information that interests you. Now you can have the latest news from CNN, Reuters, PR Newswire, and a variety of magazines and newspapers delivered through the Internet and onto your desktop — just use the PointCast Network's SmartScreen screen saver.

The PointCast Network delivers the latest headlines from top news sources to your Mac's desktop via the Internet.

You set the news agenda: Set up the PointCast Network Internet software/news service to select only the types and topics of stories you're interested in, and the SmartScreen screen saver will display four of the latest appropriate headlines, an ad, and a running ticker tape showing the current stock prices for — you guessed it — only the stocks you're following. To get the full story behind any headline, double-click on it. If you're interested in an advertised product, simply clicking on the ad takes you to the advertiser's Web site. You can also use the ChannelViewer feature to actively tune into the PointCast Network's news channels, which include weather, sports, and financial news.

If you have a continuous connection to the Internet, PointCast Network will deliver news as it appears; otherwise, you have the option of setting SmartScreen to dial into the network at regular intervals. Viewing the stories off-line is no problem: The PointCast Network puts all news stories you're interested in into a cache on your hard disk as it receives them and automatically removes outdated information.

One good thing the PointCast Network has in common with broadcast news is that it's paid for by advertisers and not by you. You can pick up your free copy at http://www.pointcast.com/. PointCast: 408-253-0894. / *CAROLYN BICKFORD*

MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of July 29, 1996. Prices (other than those for compact models, Performas, and LCs) do not include a monitor or a keyboard. The United Computer Exchange is a national clearinghouse of used microcomputer equipment.

MAC MODEL	NEW	USED
Classic II (4/40)	•	$275
LC III (4/80)	•	$300
Performa 5215CD (8/1GB)	$1,699	$1,200
Performa 6220CD (16/1GB)	•	$1,400
IIsi (5/80)	•	$250
IIci (4/80)	•	$325
IIfx (4/80)	•	$400
Quadra 610 (8/160)	•	$425
Quadra 630 (4/250)	•	$500
Quadra 650 (8/230)	•	$700
Quadra 800 (8/230)	•	$850
Quadra 840AV (8/230/CD)	•	$1,200
Quadra 950 (8/230)	•	$1,050
Power Mac 6100/66 (8/350/CD)	•	$750
Power Mac 7100/80 (8/700/CD)	•	$1,075
Power Mac 7200/90 (8/500/CD)	$1,389	$1,150
Power Mac 7500/100 (16/1GB/CD)	•	$1,875
Power Mac 8100/100 (16/1GB/CD)	•	$1,650
Power Mac 8500/120 (16/2GB/CD)	•	$2,850
Power Mac 9500/132 (16/2GB)	•	$3,000
PowerBook 180 (4/120)	•	$750
PowerBook 190cs (8/500)	$1,499	$1,150
PowerBook 520c (4/160)	•	$975
PowerBook 540c (4/320)	•	$1,500
PowerBook 5300cs (8/500)	$1,999	$1,600
Duo 250 (4/200)	•	$625
Duo 280c (4/320)	•	$1,150
Duo 2300c (8/750)	$2,999	$2,150
Power Computing Power 100 (16/1GB/CD)	•	$975
Power Computing PowerWave 604/150 (8/1GB/CD)	$3,299	$2,800

• = discontinued model

For more pricing information on these and other models, call 800-755-3033 or 770-955-0569 or visit http://www.uce.com/. And find it on ZD Net, in Library 1 (Special Reports) of the MacUser Forum (GO ZMC :MACUSER).

It's a Mad, Mad, Mad, Mad World

TYRANNICAL DESPOTS and French weapons developers might get a real blast out of these documentaries of destruction, but more-sober folk may discover that they offer a cautionary message or two.

THE DAY AFTER TRINITY. Meet J. Robert Oppenheimer — the brilliant scientist behind the atom bomb and the poignant figure who was later moved to say, "Physicists have known sin, and this is a knowledge they cannot lose" — through his contemporaries and historical footage in this CD-ROM version of the acclaimed film. $29.95. Voyager: 800-446-2001 or 416-591-5757; http://www.voyagerco.com/.

◀ CRITICAL MASS: AMERICA'S RACE TO BUILD THE ATOMIC BOMB. As you go about exploring World War II Los Alamos, you'll uncover genius, determination, betrayal, and disgrace in the lives of the folks whose "gadget" destroyed two Japanese cities. You'll also learn the basics of nuclear physics and view a time line of the nuclear age that puts atomic events in context with politics and history. Proving that every mushroom cloud has a silver lining, this title also gives you samples of the nuclear-age comics and pop culture that mutated in the fallout. $49.95. Corbis: 800-246-2065 or 206-649-3997; http://www.corbis.com/.

CNN FACES OF CONFLICT. Place your bets on which one of the world's hot spots, from Northern Ireland to Rwanda, will spark the next War to End All Wars. This title gives you the news footage, commentary, and historical context you need in order to make an educated guess. (We're putting our money on Montana.) $39.95. Graphix Zone: 800-828-3838 or 714-833-3838; http://www.gzone.com/. / *CAROLYN BICKFORD*

NEW & NOTABLE

RESOURCES

AgfaType Collection CD-ROM Version 7.0. The latest version of this high-quality pay-as-you-go CD-ROM series includes 200 exclusive designs from Agfa's Creative Alliance Library, the Cornerstone Collection of classic faces, the AgfaType Logo and Symbols Library, the Adobe Library, and fonts from FontHaus. $7 per font until September 30; $24 to $45 per font afterward. Agfa: 508-658-5600.

▼ ***Digital Image Creation: Insights into New Photography.*** We all know that the Mac has changed the way photographers work with images. Now see a spectrum of innovative work, from literal representation to surreal interpretation, by 11 graphic artists and photographers. $50. Peachpit Press: 510-548-4393.

Rat Fink Fonts. If you remember Rat Fink, that hairy rat with bulging eyeballs popular on hot rods in the 1960s, House Industries' new font collection is for you. Ed "Big Daddy" Roth, the cartoonist who created the slobby rodent, has licensed his designs for this suite of eight PostScript or TrueType fonts plus 32 EPS Monster Icons. A T-shirt is included — of course. $150. House Industries: 800-888-4390 or 302-888-1648.

ITC Charles Rennie Mackintosh. In 1896, Charles Rennie Mackintosh designed the Glasgow School of Art — and with it a distinctive style of lettering. To commemorate the centennial of this achievement of Scotland's most famous architect and designer, ITC has released two fonts and a set of ornaments based on his original drawings. $39.95. ITC: 212-371-0699.

Multimedia Graphics: The Best of Global Hyperdesign. This stunning coffee-table book provides an overview of the evolution of interactive-media design as represented in 36 projects — from printed books, to CD-ROMs, to Web sites and beyond. The preface is by noted British designer Neville Brody. $50 until January 1; $60 after. Chronicle Books: 415-777-7240.

Design Toolkit Volume 1. If you've been looking for the one CD-ROM that contains all you need in order to create a consistent graphic identity, this is it. On it you'll find 2,100 vector and bitmap graphics of borders, backgrounds, frames, labels, and alphabets, for print and multimedia publishing. Elements are in both color and black-and-white. 3G Graphics: 206-774-3518. */ PAMELA PFIFFNER*

Mac Expo's Top Ten

Our editors pick the best new hardware and software products from Boston's annual Mac extravaganza.

IT HAPPENS EVERY YEAR — twice every year, to be precise. In the winter, it's in San Francisco; in the summer, Boston. The ritual gathering of Clan Macintosh.

Together with the editorial staff of *MacWEEK*, our sister publication, we sifted through thousands of offerings from the hundreds of vendors who crowded the exhibit halls and selected the 1996 *MacUser/MacWEEK* Hot Picks — the top ten products from this year's summer expo.

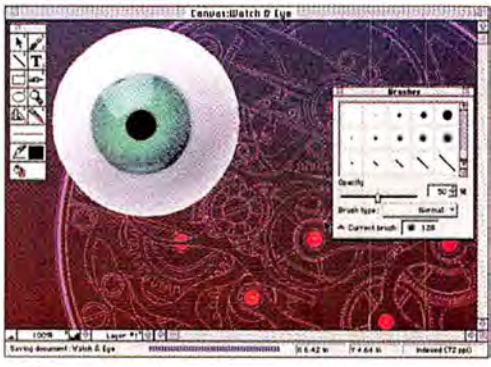
Of our four hardware Hot Picks, Power Computing's PowerTower Pro 225 was the unanimous choice for Best of Show/Hardware. Astonishing speed, a broad range of options, a great software bundle, and an affordable price tag all add up to make the PowerTower Pro 225 the best bang for your high-performance buck (see review, September '96, page 37).

Six software standouts rounded out our top ten, with OpenDoc, Internet, and professional graphics applications getting the nod. Here the competition was fiercer, but after the dust had cleared and the final arguments had been made, Fractal Design's new Detailer emerged as Best of Show/Software. With Detailer in your toolkit, working with 3-D images will never be the same — it'll be easier.

So here they are, in alphabetical order, the *MacUser/MacWEEK* Hot Picks of this year's summer expo. If you weren't among the fortunate 70,000 who made the pilgrimage to Boston last August, it's now time to introduce yourself to these ten champions.

ADRÉNALINE CHARTS AND ADRÉNALINE NUMBERS ▶. If your experience of OpenDoc has been limited to a series of one-trick demo parts, Adrénaline Numbers and Adrénaline Charts, from Adrénaline Software, will reshuffle your thinking. These sets of Live Objects — which are for spreadsheet work and graphing, respectively — produce mind-blowing 3-D graphs. Adrénaline Charts incorporates high-end 3-D controls for transparency, rotation, and lighting. Adrénaline Numbers imports spreadsheets from Microsoft Excel 5 without conversion — and according to the company, macro support is forthcoming. A beta version is due in October, and the final one is due in January; pricing had not been established as of press time.

ATI XCLAIM VR. For the ultimate in raw value, what could beat the five-in-one ATI Xclaim VR? This PCI card combines QuickDraw 3D acceleration, QuickTime-playback acceleration, QuickTime capture, QuickDraw 2-D acceleration, and a TV-out port. Your Macintosh is transformed into a screaming 3-D game machine as well as a great consumer-quality QuickTime editor — all for $269.



▲ **CANVAS 5.** If patience is a virtue, Canvas users must be exceptionally virtuous, considering how long they've waited — and waited — for Deneba's Canvas 5. But there's good news: The wait was worth it. Canvas' hybrid nature lets you work in three metaphors: illustration, publication, and presentation. The tool palette stays the same, but Canvas changes the metaphors used in the Layout menu, so, for example, you work in layers with an illustration but in pages with a publication. In addition to the usual illustration tools, you get Boolean editing features, extrusion and rotating options, and the ability to export objects in DXF format. For page layout, there's limited kerning and leading, text blocks that can be linked, and style sheets for any element. All this adds up to a powerful all-in-one graphics application.

▲ DANCER. PaceWorks showed Dancer, a full-featured 2-D-animation tool that imports many popular graphics and audio formats (including Adobe Photoshop and MIDI files) and outputs finished animations as QuickTime movies, GIF89a animations, or — get this! — Java applets. But most distinctive is its use of QuickDraw GX, which makes producing complex text effects simple. Dancer also supports tweening: Indicate key points in an animation, and Dancer will interpolate smooth twirls, color changes, path travels, and text morphing. Dancer is due to ship by the end of the year, for about $450.

DETAILER ▼. Summer show-goers were wowed by yet another winner in Fractal Design's arsenal of natural-media graphics programs. Due this fall, Detailer allows you to paint right on 3-D models in real time, achieving realistic effects without tedious effort. The $449 program, which lets you add color, light, and texture, offers a dramatic level of control and creative range. Its tools and palettes should provide a familiar environment for graphic artists and Painter users in particular: It allows you to work with crayons, felt pens, and oil brushes; spray-paint images with the Image Hose; and employ multiple floating selections. Detailer additionally supports QuickDraw 3D and third-party plug-ins.

EPSON STYLUS COLOR 500. Saving money is a good thing. Saving money on very good Mac hardware is a very good thing. Epson's Stylus COLOR 500 inkjet printer is one such product. You want brilliant photo-quality color and crisp, true-black text? You got it. How about printing at 360 or 720 dpi on plain paper, coated stock, or transparencies? Paper bags? T-shirt transfers? No problem. And you say you want it all, today? Got $279? It's yours.

GLOBETROTTER. Much of the hubbub in Hub City — as well as everywhere else in the computer industry — was about the Web. Although a plethora of new tools for creating HTML pages is entering the fray, we think Akimbo Systems' Globetrotter may have an inside track. Based on the company's FullWrite Professional, Globetrotter shows its word-processing roots in such niceties as style sheets and an outliner. Good image-map tools, CGIs for forms processing, and intelligent links also give it legs. Buy it soon after it's released this fall, however: It's only $99 for the first 60 days, $249 thereafter.

PHOTOTOOLS. The rap on Adobe Photoshop has always been "Great image editing; so-so text controls." Extensis aims to correct this situation with PhotoTools, a $99.95 set of Photoshop modules that adds such badly needed features as character-based styles, leading, tracking, and kerning. PhotoTools also has plug-ins to speed creation of drop shadows, bevels, and embossing; another module adds floating custom tool bars.

POWER COMPUTING POWERTOWER PRO 225 ▼. Atlanta wasn't the only place last summer that witnessed applause for some record-breaking performances. In Boston, the multitudes cheered as the world's fastest personal computer blew away its competition. Boasting six PCI slots, fast IMS TwinTurbo graphics, and a 225-MHz PowerPC 604e microprocessor, Power Computing's PowerTower Pro 225 is the fastest Macintosh — or PC — on the entire planet. Equally impressive are the new PowerBase desktop systems, from Power. Just don't let the deceptively humble appearance and low prices of these products fool you — these compact 180-, 200-, and 240-MHz 603e-equipped babies are absolute screamers.

VST ZIP100 DRIVE. If you're a mobile-minded PowerBook user, you, too, can join the Zip-drive revolution. VST Technologies has teamed up with Iomega and Apple to create the bootable, hot-swappable, half-pound VST Zip100 Drive, which fits into the expansion bay of the PowerBook 190 and 5300. If rumors can be believed, it will also fit into upcoming PowerBooks when it ships early next year — and no, VST hasn't yet decided what to charge for it. */ THE EDITORS OF MACUSER AND MACWEEK*

HOT PICKS DIRECTORY

Adrénaline Charts
Arénaline Numbers
price not set at press time
Adrénaline Software
Quebec, PQ
Canada
418-658-9909
http://www.adrenaline.ca/

ATI Xclaim VR
$269
ATI Technologies
Thornhill, ON
Canada
905-882-2600
http://www.atitech.ca/

Canvas 5
$599; upgrade, $99.95
Deneba Software
Miami, FL
800-622-6827
305-596-5644
http://www.deneba.com/

Dancer
$450
PaceWorks
Palo Alto, CA
415-855-0900
http://www.paceworks.com/

Detailer
$449
Fractal Design
Aptos, CA
800-297-2665
408-688-5300
http://www.fractal.com/

Epson Stylus COLOR 500
$279
Epson America
Torrance, CA
800-463-7766
310-782-0770
http://www.epson.com/

Globetrotter
$99 until December
$249 thereafter
Akimbo Systems
Somerville, MA
800-375-6515
617-776-5500
http://www.akimbo.com/

PhotoTools
$99.95
Extensis
Portland, OR
800-796-9798
503-274-2020
http://www.extensis.com/

Power Computing PowerTower Pro 225
$4,995+
Power Computing
Round Rock, TX
800-370-7693
512-246-7807
http://www.powercc.com/

VST Zip100 Drive
price not set at press time
VST Technologies
Concord, MA
508-287-4600

Your personal memories.

No other computer in the world makes it this easy to create your own home movies. Avid Cinema software guides you step by step through the entire moviemaking process, from planning shots to editing video to publishing your finished movies.

Your personal education.

It comes with some of the most popular educational software already installed and runs hundreds of other educational programs that make learning more fun—to help kindergartners learn to read and write, high school kids prepare for college or grown-ups master a second language.

Your personal finances.

The Performa 6400 computer brings the point-and-click simplicity of a Macintosh to a wide range of software for managing your family finances—programs like Quicken that help you do your taxes, track your investments and balance your checkbook.

Your personal interests.

*We've even made the Internet more personal by including your own Personalized Internet Launcher—a service from Apple that automatically searches the Internet and brings to your screen the newest and best web sites that interest you most.**

How much more personal c

**Internet service provider fees and phone charges not included. †160 and 200 MHz processors are different configurations at different price points. Monitor and printer sold separately.* *©1996 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh, Performa and StyleWriter are registered trademarks of Appl trademark used under license by Insignia from Microsoft Corporation. All Macintosh computers are designed to be accessible to individuals with disability. To learn more (U.S. only), call 800-600-7808 or TTY 800 755 0601.*

Your personal computer.

No, that cozy-looking piece of hardware isn't a newfangled ottoman. But you'll be amazed at how comfortable it feels in your home. It's the new Performa 6400 tower – built around the PowerPC™ 603e RISC chip running at 180 or 200 MHz with up to 2 gigabytes of hard drive space, and shown with the new Apple® Multiple Scan 15AV monitor and the Apple Color StyleWriter® 2500.

Introducing the Macintosh Performa 6400.

Don't be too surprised by how familiar the Macintosh® Performa® 6400 feels when you bring it home.

After all, it *is* a Macintosh – still the only computer in the world designed from the very first chip to work the way people work.

And it *is* a Performa – designed with families in mind to be easy to set up, easy to learn and easy to use.

But now we've not only given it powerful new capabilities no other home computer has ever had before. We've also made the most personal computer of all more personal than ever.

Thousands of learning and business programs are available for Macintosh. And twenty-five popular titles come preinstalled with the Performa 6400. Like Grolier's Multimedia Encyclopedia, ClarisWorks 4.0 and Quicken SE.

Right out of the box, your kids can instantly find answers to their questions, complete with video, animation and sound. And you can start working with a spreadsheet, word processor, financial tools and more.

Every Performa model comes with Macintosh PC Exchange,™ allowing you to read from and write to DOS disks. Add a program like SoftWindows™ or a PC compatibility card, and you can even bring work home from the office and run your Windows applications at the touch of a key.

Of course, all work and no play makes Jack the world's dullest parent.

That's why the Performa 6400 comes with today's most advanced multimedia features. Including an 8x-speed CD-ROM drive for the smoothest game animation and 16-bit stereo sound for the clearest listening experience. And with the addition of Avid® Cinema software, creating your own home movies becomes unbelievably easy.

It also brings the Internet home with a 28.8 Kbps modem and all the software you need not only to get up and surfing on the Net,® but to easily create your own web page as well.

And although the life span of some computers may appear to extend just beyond that of the average goldfish, we've loaded the Performa 6400 with ample power and plenty of expansion options so you and your family will enjoy it for years to come.

It's everything a family computer should be. For the name of the Apple reseller near you, and for information on special holiday promotions, call 800-446-3000, extension 100. Or visit us on the Internet at www.apple.com/

And bring home the most personal computer of all. Macintosh.

Your personal growth.

There's more than enough power for today's applications and plenty of expansion options that make it easy to add functionality no matter what you want to do – now, and down the road. When your family grows, your Performa grows with you.

an a personal computer get?

Computer, Inc. Macintosh PC Exchange is a trademark of Apple Computer, Inc. PowerPC is a trademark of International Business Machines Corporation, used under license therefrom. Avid is a registered trademark of Avid Technology, Inc. Windows is a registered trademark of Microsoft Corporation and SoftWindows is a

EXCLUSIVE

CLONE WATCH

Motorola Clones to Appear Soon

Multibillion-dollar Mac OS licensee to offer its first clones long before PowerPC Platform ships.

YOUR NEXT MAC may come from the same folks who built your cellular flip-phone. *MacUser* recently got an exclusive look at — and testing session with — the breakthrough Mac OS systems the Motorola Computer Group, based in Tempe, Arizona, is about to announce. If you're interested in the success of the Mac OS licensing effort — and who isn't? — the news is good: Motorola's unique new clones are set to have worldwide impact.

Collectively code-named Morocco, Motorola's systems are based on a new motherboard design dubbed Tanzania, developed jointly by Motorola and Apple to give Apple's languishing licensing program a much needed kick in the pants. Although Motorola's announcement of the Morocco series is proof of the Tanzania design effort's success, Apple has no current plans to ship its own Mac systems built around the Tanzania design.

A Broad Range of Choices

Morocco systems will come in two enclosures — a low-profile desktop edition and a minitower. Motorola has not yet finalized configurations, but expect the low-end configurations to begin with 160-MHz PowerPC 603e microprocessors and to range to 200 MHz and above. At the high end, expect to see 604e processors starting at 160 MHz and going up to the highest speeds available — perhaps as high as 240 MHz.

Motorola will offer customers a wide range of choices in processing power and configuration. The low-end configurations will each include a 256K L2 cache, 16 MB of RAM, 1 MB of built-in video RAM, a 1-GB IDE hard-disk drive, and an 8x CD-ROM drive. Lower-end systems will most likely be packaged in Morocco's desktop enclosure, which contains three PCI slots. High-end systems will each ship in Morocco's minitower enclosure and will include a 2-GB drive, a larger L2 cache than the low-end systems, and most likely more RAM. Motorola won't offer any RAID-configured systems, although it's likely that resellers will.

One possibility Motorola is considering to boost the appeal of some configurations is a bundled high-performance PCI 3-D-acceleration card. In its booth at Boston's annual summer gathering of the Macintosh clan, Motorola demonstrated prototype systems that contained one such card, from Matrox.

To see how Motorola's clones stack up against other Mac OS systems, MacUser Labs paid a visit to the Motorola Computer Group's Tempe headquarters. We were granted a four-hour audience with a prototype of one of Motorola's forthcoming Morocco systems. During our visit, we ran our industry-standard MacBench 3.0 test suite (see charts) and performed a variety of typical user tasks: copying files in the Finder; setting preferences in several control panels; and editing documents in Microsoft Word, ClarisWorks, and Adobe Photoshop. We found that using Motorola's clone was, well, just like using a Mac — and a pretty snappy one, at that.

The Transition Begins

Although the Tanzania motherboard design on which Morocco systems will be based is new, it does not represent a radical departure from that of previous Mac motherboards. It's not PowerPC Platform-compliant; unlike PPCP-based computers, Tanzania-based computers will not support any operating system other than the Mac OS.

In some ways, however, the new Motorola clones are more comparable to PPCP systems than to traditional Apple Mac designs. Their similarities to PPCP systems, however, have little to do with chips, slots, and ports. Rather, Tanzania and PPCP systems are similar in that both are designed specifically to lower a licensee's manufacturing costs — and, therefore, to lower the price you'll have to pay for your next Mac. The primary goal of PPCP is to move the Mac away from Apple-proprietary chip sets and toward standards that make it easier and less expensive for licensees to build Mac OS-based systems. In that sense, the move toward standardization in the Tanzania design represents a transition between previous Apple designs and PPCP.

For example, in the PC world, most motherboard makers stick close to standard form factors. This makes it easier for system vendors to use standard enclosures, which, because they're widely available, are relatively inexpensive. In contrast, Apple typically designs custom motherboards and enclosures for each new Mac line. Tanzania is the first motherboard design Apple has worked on that conforms to the LPX standard, a form factor used extensively by PC-system vendors. This will enable Motorola to use readily available standard enclosures; the resulting cost savings will translate to lower system prices.

Another way in which Morocco systems will be more like PPCP than traditional Mac systems is in the set of ports they will provide. Don't worry: You'll still get the full complement of Mac ports, which includes two GeoPort serial ports, SCSI, ADB, and sound-in and -out. But in addition, you'll get PS/2 keyboard and mouse ports, which are standard on PCs. In fact, to contain costs, Motorola may ship its low-end Morocco systems with PC mice and keyboards.

This begs an interesting question: PC mice typically sport two buttons. The left button behaves like the single button on a Mac mouse. The right button, when used in a Windows environment, pops up a context-sensitive menu wherever it is clicked. Context-sensitive menus are a planned feature of Mac OS 8. But just what the right button will do when attached to a Morocco system running System 7.5.3 is still in dispute. At press time, Motorola and Apple hadn't yet ironed out this little detail.

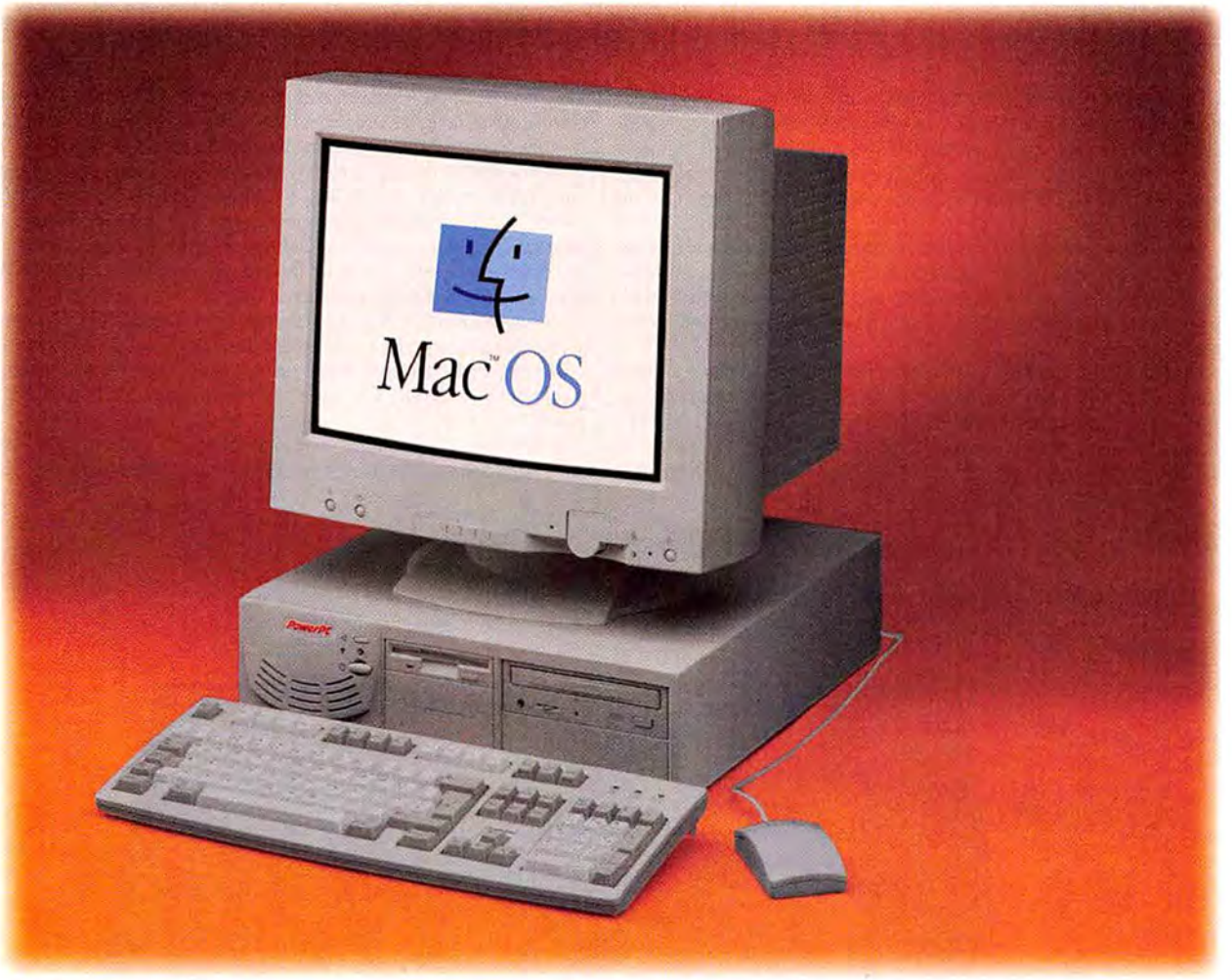
When we asked Motorola representatives what the Morocco systems will cost, they would say only that entry-level systems will start at under $2,000. But don't think Motorola's out to undersell Power Computing. After all, Power's marketing model is based on direct sales; Motorola will sell through distributors and dealers. Motorola's strategy is to offer a higher-value bundle than do other Mac OS-system vendors.

As to precisely what "higher-value bundle" may mean, here's a hint: Motorola is a top-flight

EARLY RESULTS ARE PROMISING

MacUser Labs tested a prototype of one of Motorola's soon-to-be-released Mac OS clones. It contained a 200-MHz PowerPC 603e microprocessor, a 256K L2 cache, 2 MB of on-board graphics VRAM, and a 2.5-GB IDE drive. Compared to roughly

	RAM	HARD-DRIVE CAPACITY	LEVEL 2 CACHE
Motorola Morocco 200	40 MB	2.5 GB	256K
REFERENCE SYSTEMS			
Apple Performa 6400/200	16 MB	1.6 GB	256K
Power Computing PowerBase 200	16 MB	1.2 GB	256K



Motorola's forthcoming low-profile desktop system, shown here with a PS/2 keyboard and a multibutton mouse, will be joined by high-end minitower systems.

PHOTOGRAPHY / JIM KARAGEORGE

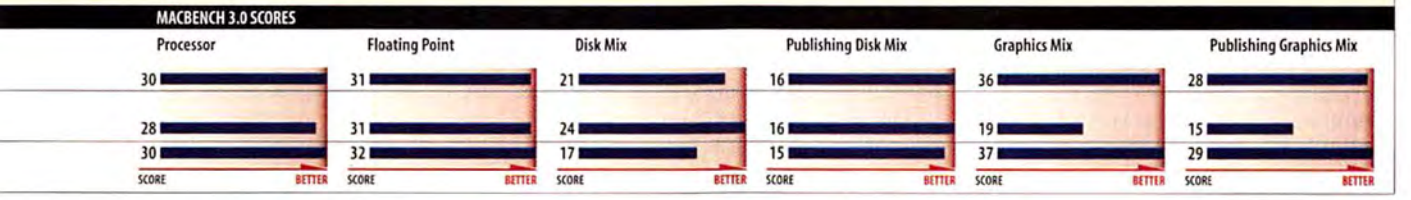
communications company and is very good at putting powerful devices into small packages. And — in case you haven't noticed — the Internet is big these days. Neither Apple (with the exception of some Performas) nor any of the Mac-clone vendors has made a point of shipping systems that are Internet-ready out of the box. Filling this glaring gap could be a big win for Motorola.

A Foot in the Corporate Door

Perhaps even more interesting than the hardware details of Motorola's Morocco systems is the company's marketing plan. In addition to selling its low-end systems into the SOHO market, Motorola is set to capture a segment of the personal-computer market in which Apple has been unable to make major strides: big business. Motorola, its executives figure, already has entrée into large corporations, because of its Windows NT servers. By offering Mac OS-based client systems as an alternative to Windows 95 ones and by putting its support structure behind the deal, Motorola hopes to make Mac OS desktop systems an easier sell in the corporate market. If the tactic succeeds, it could be responsible for the most

/ prototype testing suggests that Motorola's clone will be a solid performer

similar configurations of Apple's Performa 6400/200 and Power Computing's PowerBase 200, Motorola's clone looks like a serious contender for the SOHO market. MacBench 3.0 scores are relative to those of an Apple Power Mac 6100/60 with a 250-MB internal hard drive, which is assigned a score of 10.0 on all tests. You can download a copy of MacBench from http://www.zdnet.com/zdbop or from CompuServe (GO ZDBENCH).



THE MULTI-OS FUTURE / IBM creates the first PowerPC Platform motherboard

IT'S NOT EASY TO MAKE A MAC. Today, if computer makers want to license the Mac OS, they must also license one of Apple's motherboard designs and the company's proprietary chip set. This limits the extent to which licensees can innovate and makes clone building an expensive prospect. The PPCP (PowerPC Platform) standard, jointly developed by Apple, IBM, and Motorola, was created to relieve clone makers of these burdens.

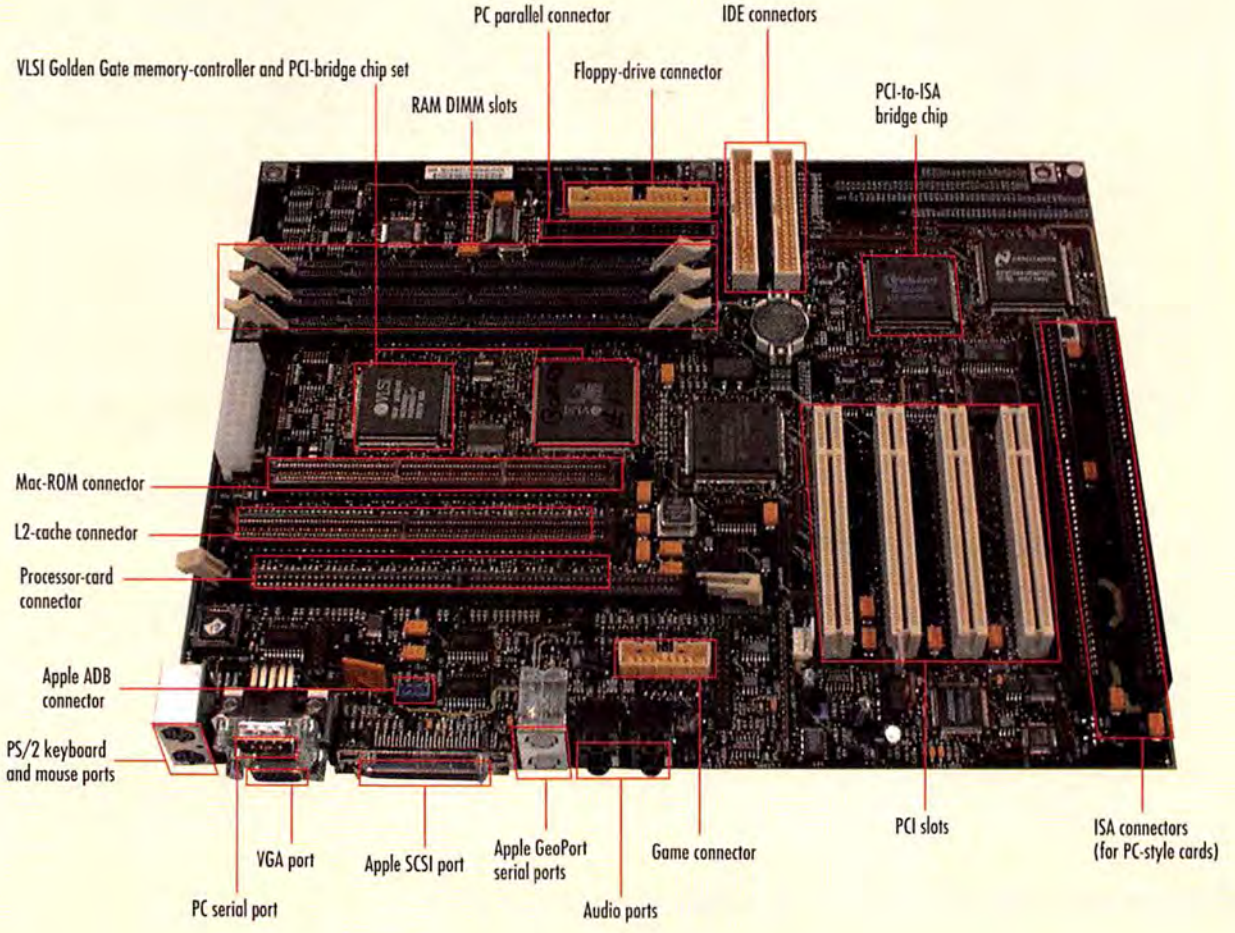
PPCP systems incorporate many parts that are standard in the PC industry and are therefore widely available at relatively low cost. PPCP also enables vendors to customize their systems more easily, without Apple's engineering support. PPCP-compliant computers can run any of several operating systems, including the Mac OS and Windows NT.

IBM's Long Trail is the first motherboard based on the PPCP standard. It incorporates VLSI's chip set for such functions as memory control and the logic bridge between the processor and the PCI bus. An optional accelerated-graphics chip set is also available from VLSI. IBM's reference design includes a full set of Mac as well as PC I/O ports, three RAM DIMM slots, four PCI slots, a processor-card slot (or PGA socket), and an L2-cache socket that can support up to 512K of cache RAM (with a different cache socket, the VLSI chip set can support an L2 cache as large as 1 MB). The Long Trail board's processor-bus speed can be as high as 66 MHz.

To date, IBM has announced Mac OS sublicenses with Taiwan-based manufacturers Tatung and DTK. They are likely to stick pretty close to the design of IBM's Long Trail PPCP-compliant motherboard. Later this year, IBM will make complete technical specifications of the Long Trail design — including reference motherboards, reference systems, and design files that will enable other computer makers to easily make design changes — publicly available.

IBM doesn't plan to make money from these reference products; it will sell them at cost, and no licensing fee is involved. IBM *will* profit by selling the PowerPC processors that are the heart of Long Trail-based systems. The PPCP-compliant version of the Mac OS — version 7.5.whatever — is expected to go beta by the end of the year.

Is IBM's own systems division — or for that matter Apple Computer — interested in building systems based on the Long Trail board? Mum's the word…so far.



IBM's Long Trail motherboard uses a PPCP-compliant design that can be implemented by other Mac-clone makers. Unlike Apple-licensed designs, the Long Trail design requires no Apple-proprietary parts.

significant expansion of the Mac OS' market share in years.

Furthermore, Motorola not only has a license to produce its own Mac OS systems but it also has the authority to sublicense the Mac OS to other computer manufacturers. Although the company has yet to announce any major PC-system vendors as sublicensees, it claims to be in serious negotiation with several, in the U.S., Taiwan, and Europe. Look for some vendors to build their own systems, using Motorola's Tanzania-based motherboard, and for others to purchase complete systems from the company and add little more than a silk-screened logo on the front of a Motorola-built box. / *HENRY BORTMAN*

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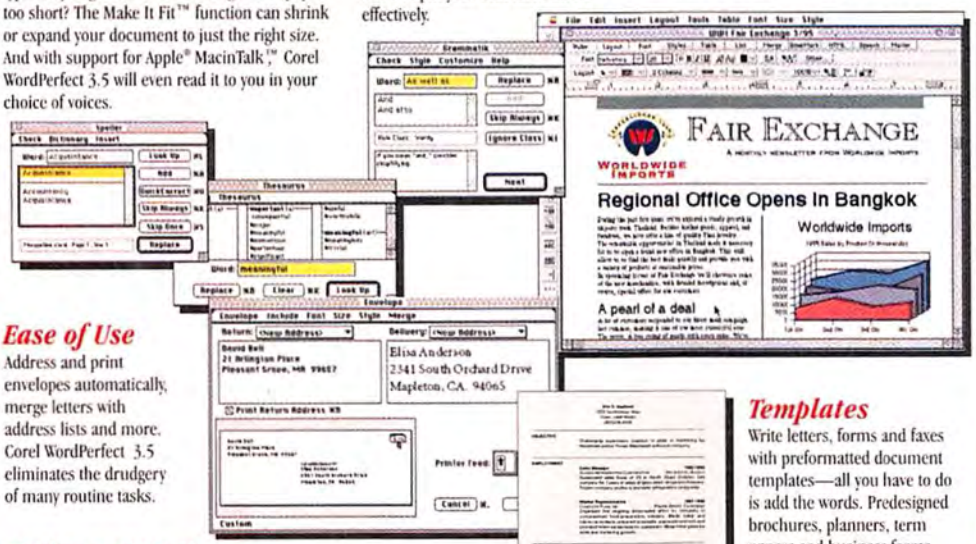

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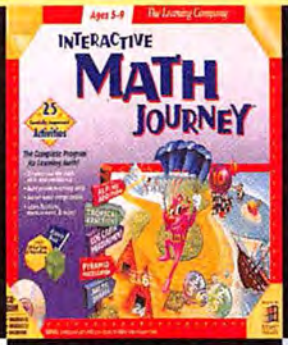
JumpStart Toddlers features musical animals, bouncing shapes and an enchanted chalkboard to present the alphabet, numbers and over 200 vocabulary words in this magical first step in computer discovery for children 18 months to 3 years. From Knowledge Adventure.



What's the best tool for kids to learn about basic fractions? A pizza, of course. That's just one of the 25 fun activities found in Interactive Math Journey. With it, kids build skills, problem-solving abilities and most important, confidence in math. From The Learning Company.

Freddi Fish and his sidekick Luther are on the case of the haunted schoolhouse and its missing toys. This undersea mystery has everything to keep the kids entertained for hours as they help the finned dynamic duo solve the crime. From Humongous Entertainment.

The Canine Revitalizer's been stolen and it's Elroy and Syd's science project. What happens if they can't solve the riddles, unravel the codes and crack basic science puzzles to solve this terrible crime? A fate too scary for any kid—summer school. From Headbone Interactive.

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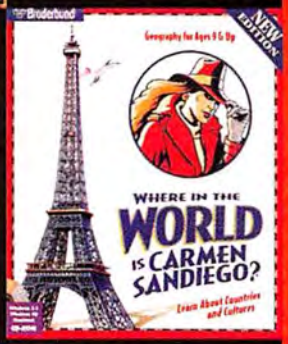
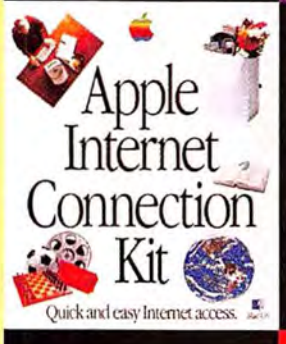
Deep within the heart of the Math Metropolis lies the secret to math success. Whether kids are having a tough time with math or are certified math superstars, Mighty Math Number Heroes will put them on the road to math greatness. From Edmark.

This new edition of Carmen helps kids with world geography and cultures as they explore 50 countries, getting fun clues from animated characters along the way. A rich database is included, with video clips from the National Geographic Society. From Broderbund.





A collection of third-party software from Apple Computer handpicked with you and the Internet in mind. You're on the web in minutes with the help of the easy-to-use Internet Dialer application. It comes with a manual too, written in simple "Apple Guide" language.

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"Lawyers from Sun Microsystems are trying to locate the owners of the fiery ball at the center of the solar system. They have some legal papers for them."

— joke commenting on Sun's aggressive defense of its Java trademark

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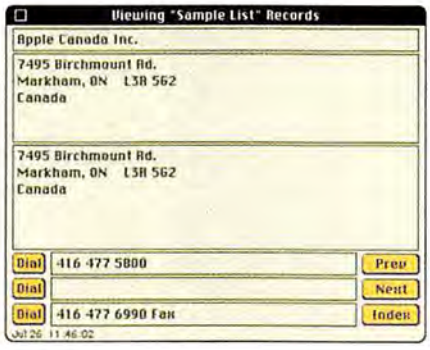
DIGITAL ADDRESS BOOKS offer the convenience of quick searches and automatic label printing, and they never fray at the edges or get left on the bus. (On the other hand, you can't *take* them on the bus unless you've got a PowerBook.) Even the most basic address-book programs offer text imports and exports, the ability to print, and extra fields for e-mail and birthdays — and the best offer much more. If you want to make the switch from the little black book to something more '90s, try one of these shareware applications.

Tim Bobo's **Cool Address Book** (★★★) is a $5 shareware address book with an easy-to-use color interface; sound effects; fields for address, e-mail, and special dates; and a price that's hard to beat. It imports and exports ASCII text and lets you sort or search for addresses. A large RAM requirement makes it impractical for those with less than 8 MB of RAM, and the main window is large and can't be resized. But all in all, Cool Address Book shows more pizzazz than many apps that cost much more.

Deb Lake made her $20 **Address Master Pro** (★★★★) compact and easy to use; in fact, it's only slightly larger than Apple's Calculator application. It offers limited file-merge capabilities, five configurable data fields, and a solid set of printing options. It's like a miniature FileMaker Pro database designed just for addresses.

Pegasus Software's $30 **Address Book** ▼ (★★★★) is well documented and satisfyingly complete. For those who are still clinging to their paper organizer, Address Book can print addresses to fit Day-Timer pages. It can also dial phone numbers for you if your fingers need a break. The author even offers technical support, not something to be scoffed at when it comes to shareware. A lot of work went into Address Book, and it shows. / *JODI NAAS*



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1. **QuickTime 2.5** / The latest version of Apple's multimedia extension
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3. **StuffIt Expander 4.0.1** / Extracts compressed and encoded files
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5. **Maelstrom** / Addictive space shoot-'em-up

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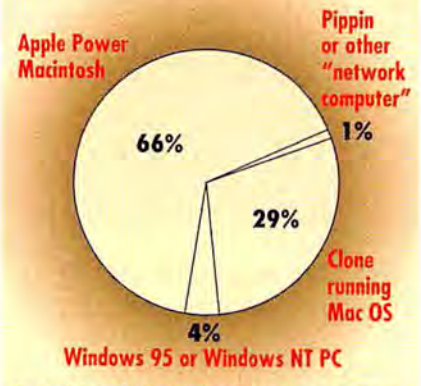

To participate in *MacUser's* online polls, go to http://www.zdnet.com/macuser/poll.html.

MACUSER UTILITY OF THE MONTH

Power Up, Power Pals

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They may be out of control, but they're also cute and cuddly, and they even come with their own theme song. The Power Pals were created by Mark Simmons and brought to life in screen-saver form by Jonathan Durkee and Joshua Cowan. Beginning September 30, they will be available absolutely free from *MacUser*'s homes on CompuServe (GO ZMC:MACUSER), the Web (http://www.zdnet.com/macuser/software/), and America Online (keyword MACUSER). Don't you deserve a Power Pal of your very own?

MACUSER ONLINE-EVENT CALENDAR

DATE	TIME	EVENT
October 3	8 P.M. EST	Help Folder with Chris 'n' Bob
October 14	9 P.M. EST	November '96 Cover Story: Digital Cameras
October 21	9 P.M. EST	Shelly Brisbin: What's New with Web Servers
October 29	9 P.M. EST	Editor in Chief Pamela Pfiffner

See the Events area at keyword MACUSER for a link to the event. Times and guests are subject to change. For up-to-date event information, check out http://www.zdnet.com/zdi/talk/talkcal.html.

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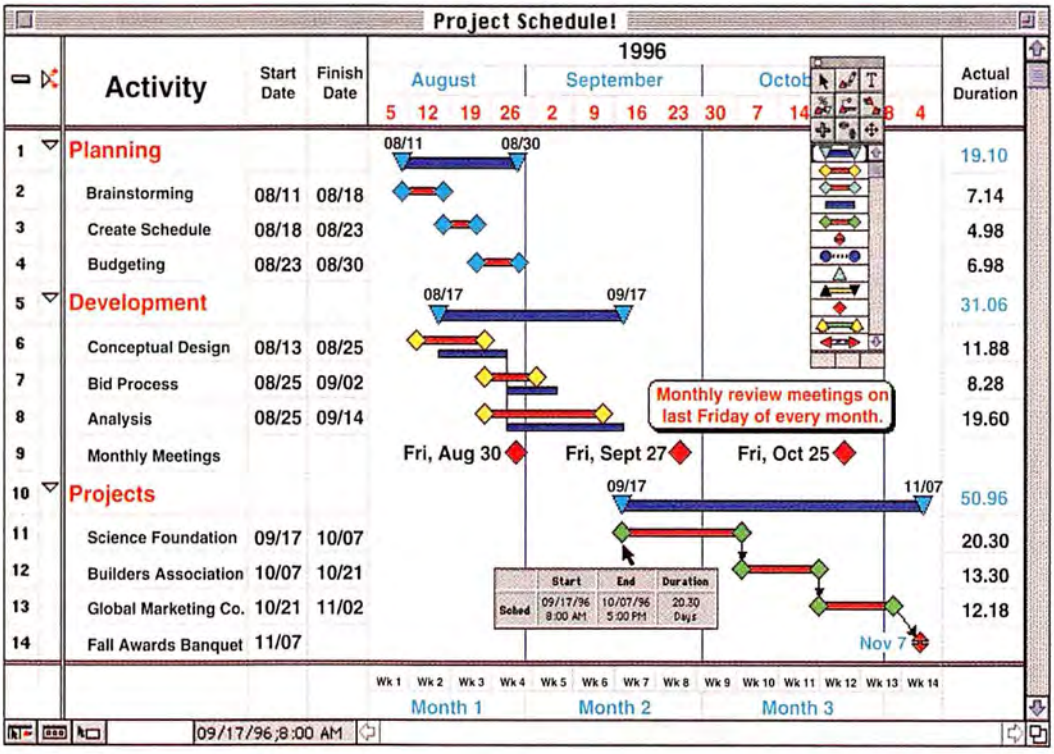

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MacWEEK REPORT

MacUser's Inside Track to Macintosh News

Copland core MIA in OS update plan

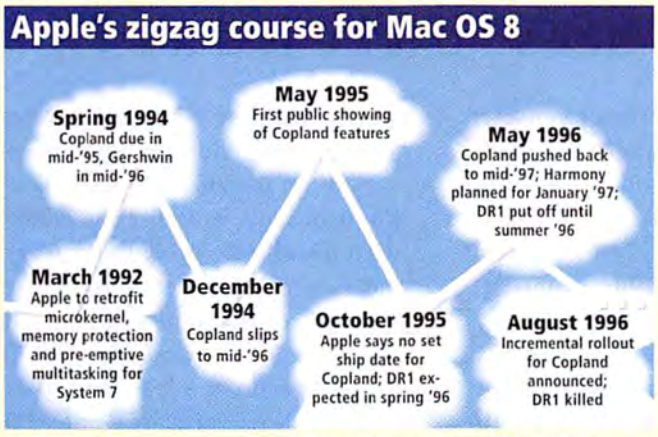
By Henry Norr

When Apple disclosed its Mac OS strategy, it got the form and content in tight alignment: The new plan to deliver Mac OS 8 technologies in increments over several years was dribbled out in fragments over the course of Macworld Expo in Boston.

The decision to switch strategies was made just days before the show by CEO Gilbert Amelio and new Chief Technology Officer Ellen Hancock. Caught off guard, lower-ranking officials were speculative and inconsistent. And no one had a clear response to the most pressing question: When will Apple ship Mac OS 8's core, microkernel-based technologies, such as protected memory, pre-emptive scheduling and symmetric multiprocessing plus the new I/O architecture, file system and patching mechanism?

Now, one thing is clear: Apple can't offer answers to such questions because it simply doesn't have them yet.

Hancock has issued a directive to her engineering team to review the entire project for Mac OS 8, code-named Copland. The aim is to eliminate all unessential interdependencies among its parts so that Apple can deliver to users as many of these technologies as possible, as soon as they are ready. Until that process is complete and management digests the results, there are no firm product plans or timetables.



OS milestones

The AppleSoft division's new intent is clear, however. The delivery of Mac OS 8 technologies will now be a multiyear process rather than a single event like the release of System 7.0 or Windows 95. At some point, Apple will drop the System 7.5 label and call the evolving operating system Mac OS 8. But that change will, in the current conception, be presented as just a milestone along a long, winding road rather than a sharp turn.

As described by Jim Gable, AppleSoft vice president of marketing, the strategy calls for major new technologies to be delivered in semiannual installments that will be classified as releases.

These will be distributed as full, bootable versions of the Mac OS rather than patches that work only atop previously installed system software. Also twice a year, on the quarters between releases, Apple will deliver smaller packages called updates. Typically consisting of two or three floppy disks, according to Gable, updates will be limited to bug fixes and minor feature enhancements.

This strategy is an extension of plans announced in May, when the company said that it would deliver a new version of System 7.5, code-named Harmony, before Mac OS 8. That upgrade remains on tap for January. Contrary to earlier reports, Gable said it will still be known as Harmony.

Its focus has shifted, however. When Harmony was first announced, officials said they hoped to incorporate some Mac OS 8 technologies, most likely parts of the Copland "user experience," or interface. Those enhancements have now been put off until the second 1997 release, scheduled for July.

See Copland, page 53

Microsoft vies for hearts and minds of Net vendors

By MacWEEK staff

Microsoft Corp. is getting cozy with a score of Macintosh Internet developers, and the Mac community is abuzz over the company's intentions.

Noting that the company sponsored booths for several Mac Internet developers during the Boston Expo, a recent press report suggested that Microsoft's motivation ranged from a fear of the U.S. Department of Justice to a big-hearted attempt to boost Apple's market share.

But according to Microsoft and several Macintosh Internet developers, the Redmond, Wash., company's intentions are closer to home.

"We don't think about the Mac market share; that's Apple's problem," said John Ludwig, vice president of Microsoft's Internet Platform and Tools Division.

Microsoft wants to promote its technologies, Ludwig said, including the Internet Explorer Web browser; new programming libraries; and its component architecture, called ActiveX, for use in Macintosh products.

Business opportunities

"The Internet is a huge opportunity, and Microsoft has moved fast to capitalize on it," said Roy Leban, chief technologist at Akimbo Systems of Somerville, Mass. "Microsoft's motivations are the same as for the rest of us: to make money."

Rich Siegel, founder of Bare Bones Software Inc. of Bedford, Mass., said his talks with Microsoft have focused on shared goals. "They did not call us up and say, 'You have to support our product.' They did say, 'Hey, you are doing interesting stuff. Let's see if we can work together,' " he said.

To make inroads into the market, Microsoft created a Mac-centric development team and joined a newly formed group promoting Mac Internet standards.

Ludwig said Microsoft's Internet Platform

See Microsoft, page 51

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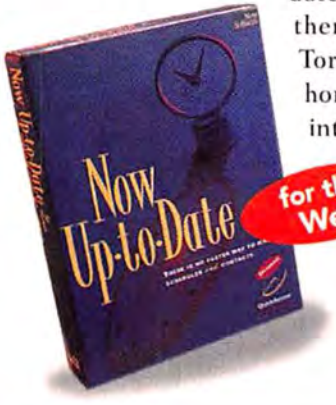

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CIRCLE **82** ON READER SERVICE CARD

Microsoft

From page 47

and Tools Division's San Jose, Calif., office, nicknamed MS Bay, houses veterans of longtime Macintosh vendors. This Macintosh-only group is led by General Manager Don Bradford, a former engineer for Claris Corp. and Aldus Corp. Bradford has been meeting informally with Macintosh developers since March to leverage existing technology and build support for MS Bay's efforts.

"These guys have come up with a lot of cool technologies," said Chuck Shotton, a fellow at Quarterdeck Corp. of Marina del Rey, Calif., and the primary author of WebSTAR.

For example, Bradford said MS Bay is creating an Internet Services Library, a suite of reusable code that it wants Macintosh Internet developers to adopt. The code handles the most popular Internet protocols, including HTTP (Hypertext Transport Protocol), FTP, Post Office Protocol 3, SMTP (Simple Mail Transfer Protocol), Network News Transfer Protocol and Secure Sockets Layer.

The code will be delivered both as traditional Macintosh libraries used by the Code Fragment Manager and as ActiveX parts. Microsoft is creating discrete HTML-rendering code that anyone could license to use for built-in Web display features. Bradford said the company is developing its own Java virtual machine in ActiveX.

Despite reports to the contrary, Mac Internet developers deny they have been offered cash by the Redmond giant. "Microsoft is not offering us any money, and we don't have any expectation of getting it," Bare Bones' Siegel said.

Ludwig and Bradford said Metrowerks Inc. of Austin, Texas, which is working on the Macintosh implementation of ActiveX, is the company's only business partner in the Mac Internet market.

Mac-based Internet standards

Microsoft helped form the Macintosh Internet Developer Association (Midas), a consortium of Internet companies. The group was formally announced at Macworld Expo this August with the goal of helping Internet companies collaborate on standards for Macintosh-based software and as a clearinghouse for information.

The group comprises 14 vendors, including Akimbo, Apple, Bare Bones, InterCon Systems Corp., Maxum Development Corp., Netscape Communications Corp. and ResNova Software Inc.

Dave Winer, president of UserLand Software Inc., a Midas member and the developer of the Web scripting tool Frontier, said that in the group "developers can discuss ideas, provide support and ratify standards that can then be added to products." □

Express line on '97 track

By Stephen Howard and Joanna Pearlstein

There's no rest for the wicked fast. As Apple rolled out its latest Macs this August in Boston, engineering teams in Cupertino, Calif., reportedly worked on a flagship series due in June 1997 that will highlight subsystem speed and multimedia.

Code-named PowerExpress, the upcoming high-end line of PowerPC 604e-based Macs will use one basic motherboard within three new box designs, sources said.

When released toward the middle of 1997, a low-profile three-slot PowerExpress model will hold the baseline processor of the series, reportedly a 225-MHz 604e. A midrange minitower design, code-named Stumpy, is expected to run at 250 MHz, and a 280-MHz chip will power a six-slot, seven-bay tower chassis called K2. Multiprocessor models will be costlier variations on both the midrange and high-end designs, sources said.

Although prices for the series will reportedly remain in the $2,500 to $5,000 range, the company is aiming higher as well. Sources said the fastest multi-CPU PowerExpress machines may cost up to $8,000 when equipped with Apple's forthcoming multimedia add-ons.

PowerExpress will follow an interim round of faster Macs, code-named Montana and also known as Power Mac Pro, sources said. Originally planned for November, the Montana line is expected to ship in January or February with speeds ranging from 160 to 225 MHz; that line will reportedly replace the systems introduced in August. The top Montana model will also use the easier-to-access K2 tower chassis.

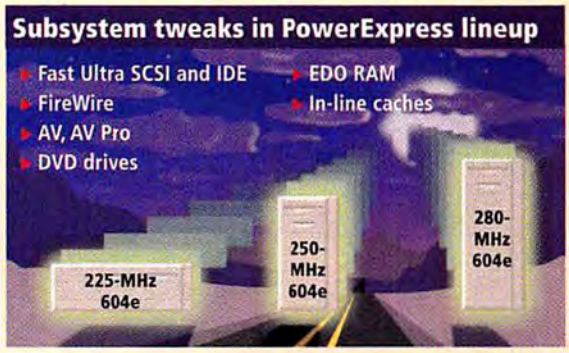
Neither of the new Mac lines planned for the first half of 1997 will be based on the multivendor PowerPC Platform (PPCP) specification, sources said. The product plans of Apple's Alternative Platforms Division, which is now responsible for the company's PPCP efforts, are not known.

According to sources, the CPU clock rates for the fastest PowerExpress machine will depend at least partially on chip availability. Sources said the company is resigned to having clone makers bring faster CPUs to market first, since the larger PowerPC volumes Apple requires prevent its early adoption of the speediest chips.

Sources said a key feature of the PowerExpress line will be new audiovisual options centering on digital video. Apple is reportedly developing two new AV cards that may be offered with PowerExpress systems. The professional version of the card will include 3-D acceleration. In addition, the June 1997 Macs will have improved on-board sound capture and playback features.

The PowerExpress design will tweak virtually every hardware subsystem in the current PCI Mac design, but one of the bigger I/O changes will be optional. With these machines, Apple will introduce its own PCI card that implements the IEEE 1394, or FireWire, standard. Expected to provide data transfer rates of up to 50 Mbytes per second, the FireWire card will link the Mac to digital video decks, digital camcorders and other Macs.

The forthcoming PowerExpress models will have 16 or 32 Mbytes of RAM, and Apple will move to an EDO (Extended Data Out) RAM architecture to improve the delivery of data to the CPU; EDO RAM is commonly used in newer Intel-standard PC systems. Sources said the new machines will also sport a faster, 512-Kbyte Level 2 cache architecture that will be housed on the CPU daughtercard rather than on the motherboard, as it is today.



The PCI bus itself will reportedly be improved on these new Macs for high-bandwidth uses through a new PCI bridge chip. Likewise, the built-in graphics display circuitry in the PowerExpress will be significantly faster than in the current Power Mac 7600 and 8500 models. The two SCSI buses of the PowerExpress line will be upgraded to Fast SCSI-2 externally and Fast Ultra SCSI-3 internally, sources said.

Apple is still mulling over how and when to integrate DVD (Digital Video Disc) drives into the Macintosh line; sources said some configurations of the midrange and top-speed PowerExpress models will include DVD drives for the 4.7-Gbyte disc standard, but the slowest machine will come with the now-standard 8x CD-ROM.

Apple declined to comment. □

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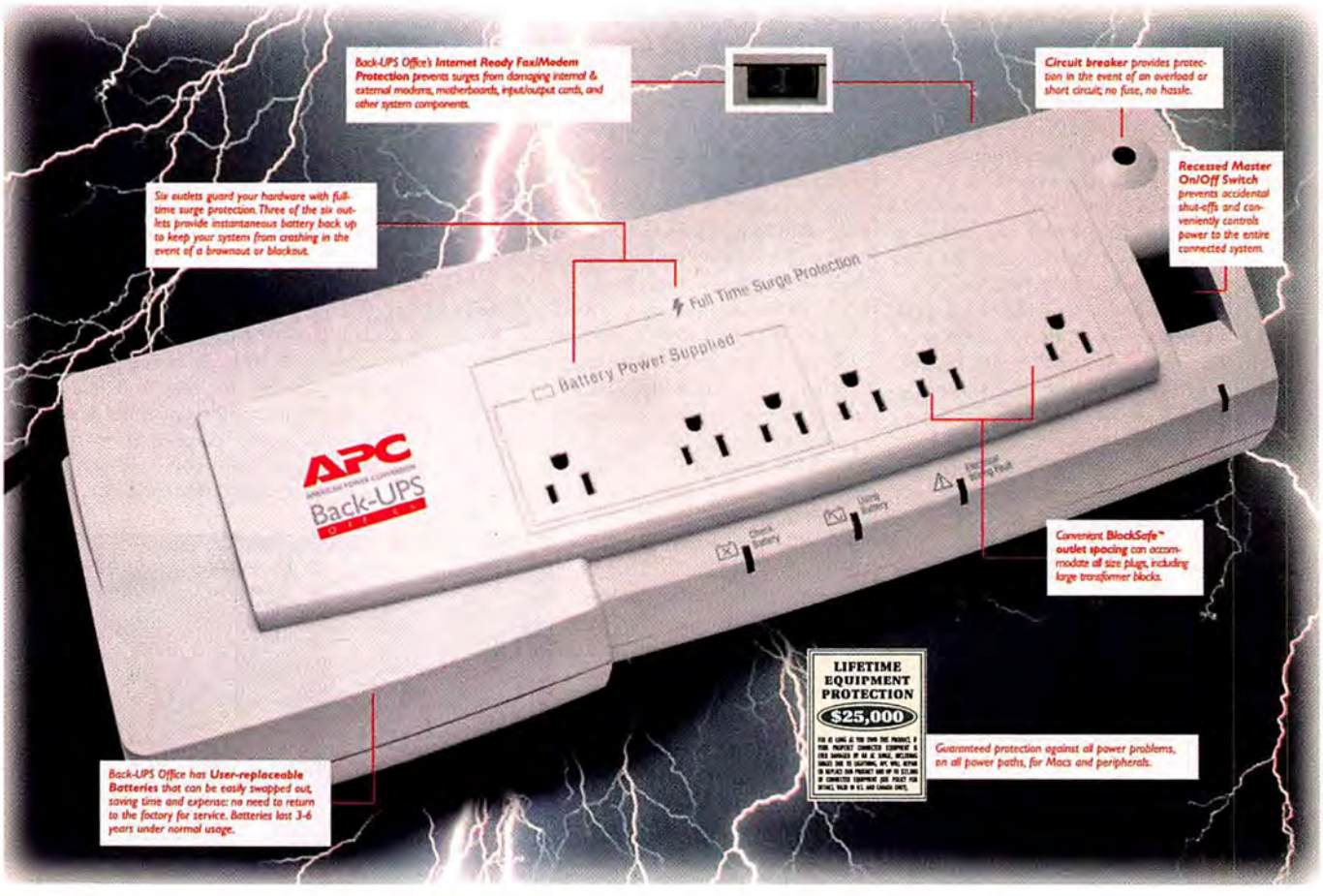

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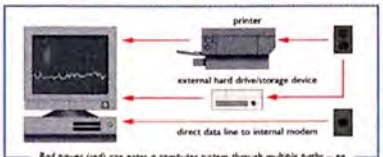

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Spikes	•	•	•
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CIRCLE **83** ON READER SERVICE CARD

Copland

From page 47

The January release will bring users up-to-date with the latest, post-System 7.5.3 versions of existing system components. The list of updates to be added includes QuickTime 2.5 and a new Open Transport, but the main focus will be on OpenDoc and Cyberdog, which will for the first time become standard OS features rather than optional extras.

Apple officials said the company has two goals for this package. One is to bolster the Mac's image as a state-of-the-art Internet platform. The competitive pressure is on because Microsoft Corp. is planning a year-end update to Windows 95, code-named Nashville, that will further integrate the Internet into its OS. Apple's other objective is to stimulate the emerging market in third-party Live Objects.

The July 1997 release, which Gable said does not have a public code name, will be the first to incorporate Mac OS 8-specific technologies. As with the original Harmony plan, the most likely candidates are interface innovations, such as spring-loaded folders and pop-up drawers. Apple also said it hopes to make the long-awaited PowerPC-native, multithreaded version of the Finder part of the July release.

The Copland foundation

The plan for next year's OS releases implies that the microkernel and related enhancements — the technologies designed to make Mac OS 8 a modern, high-performance, high-reliability, multitasking OS that could stand up to competitors such as Windows NT — won't reach users until 1998 at the earliest.

Currently, most of these low-level features are interdependent, so they would have to be delivered in a single release. But Gable and Ike Nassi, senior vice president of AppleSoft, said engineering teams are currently engaged in an intensive effort to find ways to deliver low-level features on an incremental basis.

"When I worked on BSD [Berkeley Standard Distribution] Unix, we used to rip out the kernel on a regular basis, and everything just kept running," Nassi said. "There are things you can do if you have a strong enough fire wall between the OS and the apps."

In some cases, Nassi added, Apple might decide to scale back features to speed the initial release. But in at least one area — memory protection — Apple is looking beyond the original Copland conception in hopes of finding ways to protect traditional applications as well as faceless background processes.

"It's the subject of very active investigation," Nassi said. "We have people working on a couple of different approaches, and we have not settled on one yet. We know memory protection is important, and we want it as soon as possible." □

Java to filter into Mac OS with Harmony

By James Staten

Apple last month lent credence to its promise of delivering Java within the Mac OS. At Macworld Expo in Boston, the company gave the first public demonstration of prerelease software that runs Java applets in the Finder.

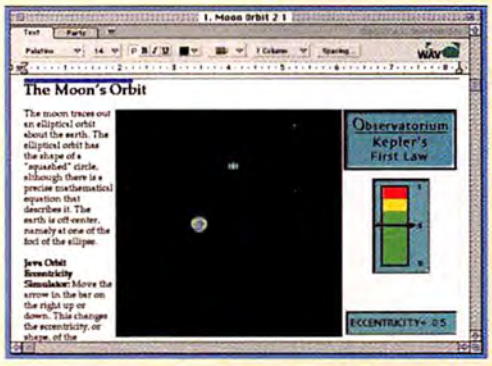
Apple said it would post the Mac OS Runtime for Java (MRJ) components at http://dev.info.apple.com; they will also be distributed on OpenDoc Developer Release 6. The final version is expected to ship with the next major release of the Mac OS, code-named Harmony, due in the first quarter of 1997.

MRJ consists of a Java virtual machine, the standard set of eight Java classes from Sun Microsystems Inc. and two implementations of the Java applet viewer: a stand-alone desktop application and a Live Objects part for OpenDoc applications. Both 680x0 and PowerPC versions are in development. Only the Power Mac version was shown at the expo. Apple said the MRJ requires 1 Mbyte of RAM and 2 to 3 Mbytes of disk space.

The version demonstrated contained Sun's virtual machine and no just-in-time (JIT) compiler, said Eric Shapiro, Apple Internet component evangelist. The applet viewers for the Mac desktop and OpenDoc were written by Apple, he said. Shapiro said Apple plans to let users run both Java applets and full-blown Java-based applications in the OS.

Apple in May licensed a Java virtual machine from Sun, along with a virtual machine and a Java JIT from Natural Intelligence Inc. of Cambridge, Mass. Shapiro said Apple will replace its virtual machine with a faster version that includes a JIT based on code from Apple and Natural Intelligence. Also expected with the final version is a collection of APIs that will let developers Java-enable their non-OpenDoc applications. Apple said it also plans to increase the capabilities of Java.

Jim Gable, vice president of marketing for AppleSoft, said the company is working with Sun on JavaBeans, an interoperability layer that will let OpenDoc parts and Java applets communicate. Shapiro said the company is working on tools to let developers write OpenDoc parts in Java so that a single part can be deployed on multiple platforms. □



Apple's Java Live Objects component lets users grab applets from the Internet and run them from within any OpenDoc document.

Be closes in on prime time

By David Morgenstern

Bopping into the Boston Expo, Be Inc. gave a demonstration of BeOS running on a Macintosh. The company said users of some Mac models will be able to purchase shrink-wrap copies of its multitasking OS in the first quarter of 1997.

The Menlo Park, Calif.-based company showed BeOS playing QuickTime movies, rendering 3-D graphics and running games on Power Computing Corp.'s PowerCenter 120, which runs on a 120-MHz PowerPC 604 processor. Be said it will support PCI Mac systems with 603, 603e, 604 and 604e chips; it has no plans to support 601-based machines.

The speedy BeOS software was able to simultaneously play four QuickTime movies in real time without dropping frames. According to Mark Gonzales, Be's marketing director, the speed is due to BeOS' low-level "rationalized system design," which supports multiprocessing and multithreading on a single-processor Macintosh. He said every window displayed is a new thread for the OS.

The PowerCenter's video architecture is faster than that of the BeBox, according to Benoit Schillings, Be software engineer. At Expo, the company also introduced its $2,995 BeBox Dual603-133, which sports two 133-MHz 603e processors, 16 Mbytes of RAM and a 2-Gbyte SCSI hard drive. The company said there are few applications for the BeBox. However, Gonzales said Be and many third-party developers plan to unveil products for the OS at the San Francisco Macworld Expo, next January. □

4:45 PM Sending my 48 meg file to be printed.
Color calibrating? Three clicks, all done.
Traps and overprints? They all showed up.
Revisions? OK, so I'm a little obsessive.
The comp? It actually matches the screen.

5:00 PM What's next? I'm out of here.

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CRT Size	21"	20"	17"	17"
Viewable	20.0"	19.1"	16.0"	16.0"
Horizontal Scan Rate	30-96 KHz	30-85 KHz	24-82 KHz	30-65 KHz
Maximum MAC® Resolution	1600x1200	1280x1024	1280x1024	1024x768
Color Control	Yes	Yes	Yes	No
CRT Warranty	3 Years	2 Years	3 Years	2 Years
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CIRCLE **100** ON READER SERVICE CARD

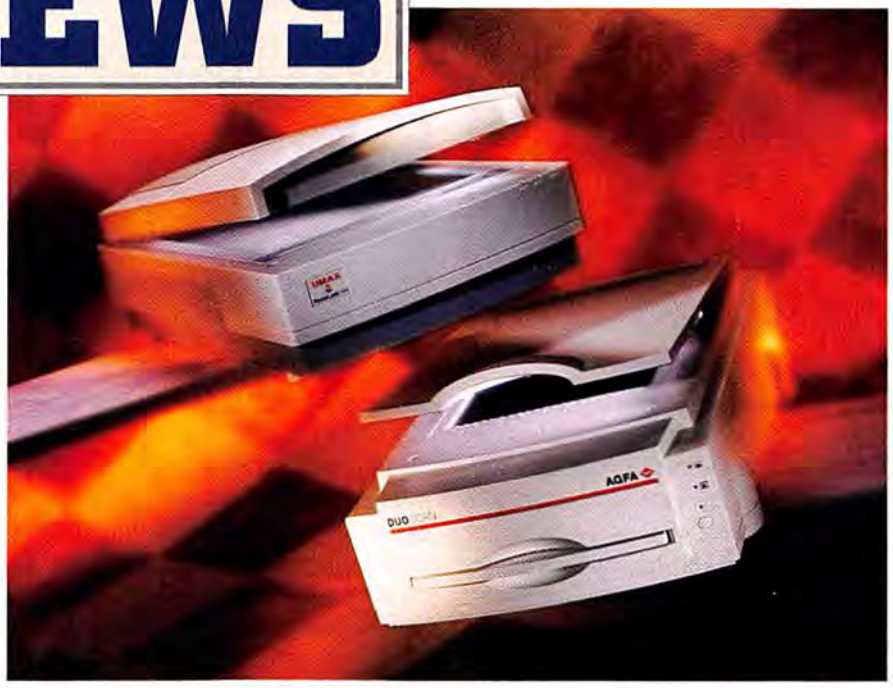
REVIEWS

Scanners

Agfa DuoScan ★★★★

UMAX PowerLook 2000 ★★★½

Professional features in affordable flatbed scanners.



TWO NEW FLATBED SCANNERS from industry stalwarts Agfa and UMAX arrive amid some pretty highfalutin claims: Both purport to deliver high-end, drum-scanner quality to the desktop. Although neither device quite lives up to that billing, each one offers some impressive professional-caliber features, including batch-processing capabilities and built-in slide and transparency scanning. Even more important, each delivers these benefits at a cost of approximately $5,000 — about one-sixth of what you might expect to pay for a top-of-the-line drum scanner.

The Agfa DuoScan and the UMAX PowerLook 2000 are desktop flatbed scanners with an optical resolution of 1,000 dpi. That's ample for nearly all business publishing jobs and for most graphic-arts uses as well. (Ordinarily, your scanning resolution should be about twice the line screen of the press your image will be printed on; magazines such as *MacUser* are typically printed at 133 dpi, so 300 dpi is an adequate scanning resolution for them.) The DuoScan accepts originals up to 8.5 x 14 inches; the PowerLook 2000 handles sheets up to 8.5 x 12 inches.

One characteristic that makes both the DuoScan and the PowerLook 2000 appealing to publishing pros is the ability to scan reflective originals, such as photographic prints and printed pages, and transmissive ones, such as negatives, slides, and transparencies. For transmissive originals, the PowerLook 2000 ships with a transparency cover; to scan a transparency, you place it on the scanner bed, just as you would a reflective original. This is the traditional method used by flatbed scanners, although transparency covers are usually sold as add-on options.

The DuoScan takes a radically new approach to transparency scanning: A glass bed that slides *under* the main scanner bed serves as the frame on which you mount your slides and transparencies. An advantage of this approach is that it requires light from the DuoScan's internal source to pass through just two potentially distorting glass surfaces en route to the photoreceptor that senses color information from the image. In a lid-mounted transparency scanner such as the PowerLook 2000, light is required to pass through four glass surfaces.

The hardware design of the DuoScan gives it an edge over the PowerLook 2000, particularly with respect to transparency scanning. Ironically, however, the DuoScan's software suite doesn't take full advantage of the scanner's hardware capabilities.

Software

The software packages bundled with the DuoScan and the PowerLook 2000 are similar in many ways. Both scanners ship with full editions of Adobe Photoshop (although the version that ships with the PowerLook 2000 conspicuously lacks any manuals). Both come with applications you use to adjust scanner settings and perform color corrections before you scan your image. (These scanning apps work as stand-alone programs and as plug-in modules accessible from within Photoshop.) And both come with color-correction software you can use on images after you've scanned them.

Functional similarities aside, however, the DuoScan's software — a scanning program called FotoLook and a color-correction tool called FotoTune — provides fewer tools than the software furnished with the PowerLook 2000. FotoLook in particular lacks tools that graphics and publishing professionals need: Instead of the common magnifying-glass zoom tool, which lets you step through multiple zoom levels to zero in on any area of an image, FotoLook gives you a clumsy all-or-nothing 200-percent-zoom button. Even worse, FotoLook lacks Photoshop-like levels controls for balancing color levels and offers only limited curves controls for tonal adjustments. (A pop-up menu containing several gamma presets approximates Photoshop's Curves function, but with far less precision.)

According to Agfa, it intentionally limited the

REVIEWS RATING KEY	
★★★★★	OUTSTANDING
★★★★	VERY GOOD
★★★	ACCEPTABLE
★★	POOR
★	SERIOUSLY FLAWED
💣	DANGEROUS

PHOTOGRAPHY / ADRIAN ORDENANA

MIXED-MEDIA BLUES / scanning a positive cancels a negative

The image at left is the result of an unsuccessful attempt by the UMAX PowerLook 2000 to capture a color image from a transparent negative in a batch that also contained positive transparencies. At right is the image captured by the PowerLook 2000 in a single-image scan.

range of controls to make the DuoScan simple to use; instead, in our opinion, it made taking full advantage of the scanner's capabilities difficult. Although the scans we obtained with the DuoScan were of good quality, many ended up looking a bit dull and flat. The captured images also exhibited some red cast. We could have compensated for these problems by using better correction tools, but Agfa didn't provide them.

UMAX didn't make the same mistake with the PowerLook 2000. For starters, its MagicScan scanning application provides useful levels and curves controls that afforded us more-accurate scans than we were able to get with the DuoScan and FotoLook. We did see some red shifting similar to what we saw with the DuoScan, but it was much reduced, thanks to MagicScan's better controls.

Many users will also appreciate a second automated-scanning application that UMAX supplies with the PowerLook 2000. The program, binuscan's PhotoPerfect, does a good job of adjusting color balance automatically. The software boosts brightness and contrast so that images "pop" off the page in a way that's pleasing for most images. This pop comes at a price, however: When we scanned images with the PowerLook 2000, using PhotoPerfect, the results exhibited an exaggerated "jagginess," or pixelation, which we saw to a lesser degree on images scanned using UMAX's MagicScan software. (Scans obtained by using the DuoScan with FotoLook software, in contrast, showed no pixelation at all.)

The Batch Game

Both the DuoScan and the PowerLook 2000 let you do batch scanning: They can capture multiple originals placed on the scanner bed at the same time and can save each as a separate file. Even niftier, working in transparency mode, each can capture positive and negative slides in the same batch and convert them all into positive image files — or at least that's what Agfa and UMAX claim.

When we tested each scanner's ability to perform this handy chore, only the DuoScan was up to the task. When we tried to scan a positive and a negative with the PowerLook 2000, the negative produced a file that appeared terribly overexposed — it had a foggy-blue cast that rendered the image virtually unrecognizable.

The PowerLook 2000 was able to handle unmixed batches of transparencies without difficulty, but we found that it didn't do quite as good a job as the DuoScan did. This is due in part to differences in the ways the scanners calibrate themselves (check their color levels against internal targets) while doing batch scans. The PowerLook 2000 calibrates itself once per batch during a low-resolution prescan of all the images on the scanner bed. The DuoScan calibrates itself once for each image in the batch. The extra calibration steps means that the DuoScan takes considerably longer to perform a given scan than the PowerLook 2000 does, but the result is more-consistent color fidelity.

The Bottom Line

Agfa's DuoScan and UMAX's PowerLook 2000 are impressive desktop scanners that deliver professional-caliber tools at a price within the reach of small-to-midsized offices and design studios.

The DuoScan, with its innovative slide-in transparency drawer, offers the better hardware design, but it does sell itself short with the abbreviated tool set in FotoLook. The PowerLook 2000, by contrast, offers a more flexible software bundle. Both are very good scanners, well suited for a broad variety of business and desktop-publishing uses. If we could merge the best features of both, we'd come very close to the ideal flatbed scanner.

/ Rick Oldano and Jim Shatz-Akin

Agfa DuoScan, $5,500 (list). **Company:** Agfa, Ridgefield Park, NJ; 800-685-4271 or 201-440-2500; http://www.agfahome.com/. **Reader Service:** Circle #403.

UMAX PowerLook 2000, $5,495 (list). **Company:** UMAX Technologies, Fremont, CA; 800-468-8629 or 510-651-4000; http://www.umax.com/. **Reader Service:** Circle #404.

IMAGE SHAPING / how hardware and software affect scans

The image at left, scanned on the UMAX PowerLook 2000 scanner with UMAX's MagicScan software, has good color accuracy but is a bit too soft. The middle image, by contrast, also obtained from the UMAX scanner but with binuscan's PhotoPerfect software, is sharply focused but exhibits overly "electric" colors. The image at right, obtained from the Agfa DuoScan scanner, using Agfa's FotoLook software, is sharply focused and color-accurate.

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Mac OS Systems

PowerTower 200e ★★★★½

PowerTower 180e ★★★★

PowerPC 604e chips speed into the PowerTower line.

BY WAY OF UPGRADING its PowerTower line, Power Computing has added a new model, the PowerTower 200e, to the top end and has replaced the former PowerTower flagship, the PowerTower 180, with the PowerTower 180e. That little vowel in the new models' names is anything but silent — in fact, it screams.

The *e* signifies the migration of the PowerPC 604e, previously available only in Power Computing's top-speed PowerTower Pro line, downstream to the more affordable PowerTower computers. The new PowerTower models offer dramatic proof of the new chip's extra muscle — at extremely attractive prices.

The PowerTower 200e is Power's quid pro quo for Apple's recent upgrade of the Power Mac 9500, which now has a 200-MHz PowerPC 604e instead of a 180-MHz PowerPC 604 (see review, October '96, page 41). Like the Power Mac 9500/200, the PowerTower 200e is built around a 200-MHz PowerPC 604e. And like many recent Power Computing offerings, it manages to extract greater speed from its processor than its Apple counterpart does. The PowerTower 200e beat the Power Mac 9500/200 by about 14 percent in our MacBench 3.0 Processor test, in large part due to its larger Level 2 (L2) cache: The PowerTower 200e ships with 1 MB of L2 cache, whereas the Power Mac 9500/200 comes with 512K.

The PowerTower 200e compares even more favorably to the Power Macintosh 9500/200 for graphics speed. This is attributable to the differences in the two systems' graphics cards. The Power Macintosh 9500/200 ships with a no-frills ATI Xclaim GA graphics card with 2 MB of video RAM; each PowerTower ships with an IMS TwinTurbo card loaded with 8 MB of VRAM.

As to hard-drive speed, the PowerTower 200e's 2-GB Micropolis drive outscored the Power Mac 9500/200's 2-GB Seagate drive in our MacBench Disk Mix test, which measures the transfer speed of small-to-midsized files. The PowerTower 200e's drive scored the same as the Power Mac 9500/200's in our Publishing Disk Mix test, which measures the speed for handling big data chunks.

Although the PowerTower 200e certainly compares favorably to the Power Macintosh 9500/200 in our MacBench tests, you don't need any benchmarks to see what may be the PowerTower 200e's most impressive advantage over its Apple rival. All you need to do is take a look at the price tag.

Dropping in a New Engine

The PowerTower 200e sets the new high-water mark for Power Computing's PowerTower line, but examining its impressive speed characteristics is in some ways less interesting than studying its slightly slower sibling, the PowerTower 180e. That's because the chief difference between the PowerTower 180e and its predecessor is the processor: A 180-MHz 604e replaces a 180-MHz 604. In our MacBench 3.0 Processor and Floating Point tests — the ones most directly related to the central processor alone — the 604e's strengths versus the original 604 are evident: The PowerTower 180e outscored the PowerTower 180 by 25 percent in the Processor test and by approximately 14 percent in our Floating Point test.

Some of this speed boost can be attributed to the L2-cache size: The PowerTower 180e comes with 1 MB of L2 cache — double the 512K that shipped with the PowerTower 180. But the 604e's on-board Level 1 data and instruction caches, which are double the size of those of the original 604, share much of the credit for the higher scores.

Like the PowerTower 200e, the PowerTower 180e ships with a speedy 8-MB IMS TwinTurbo graphics card and a 2-GB Micropolis hard drive. And a keyboard. And a terrific office-productivity software bundle. And — get this — it costs about $1,500 less than the original PowerTower 180.

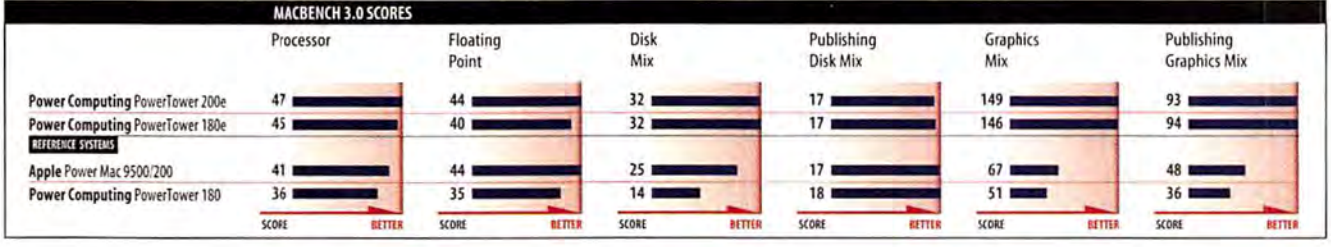
The Bottom Line

With the PowerTower 200e and 180e, Power Computing continues its charge to be the value leader among Mac OS-system vendors. The new PowerTowers deliver impressive speed at a great price and once again throw down the gauntlet to Apple. / Jim Shatz-Akin

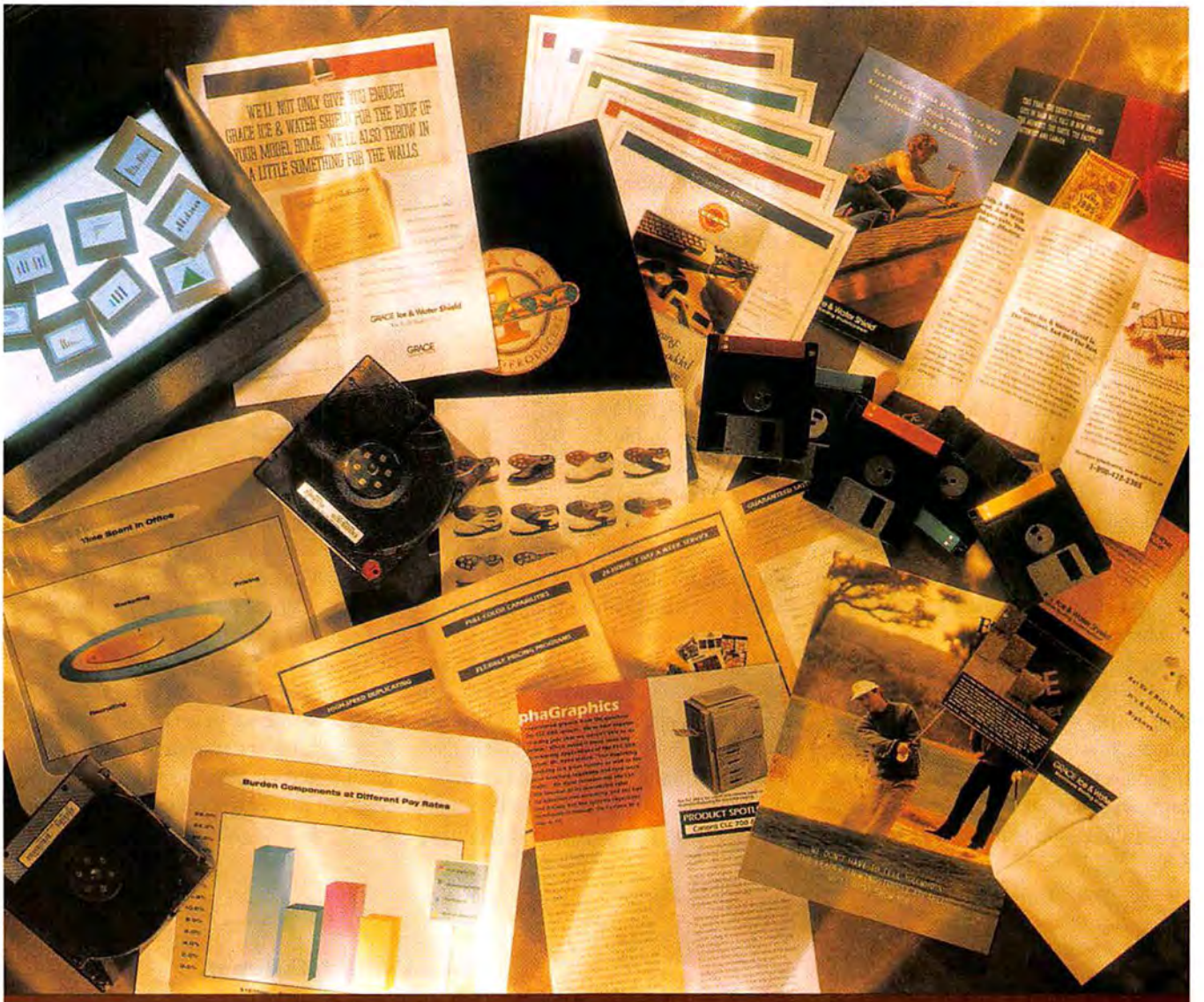
Power Computing PowerTower 200e, with 32 MB of RAM, a 2-GB hard drive, and 1 MB of L2 cache, $3,824; **PowerTower 180e** with 32 MB of RAM, a 2-GB hard drive, and 1 MB of L2 cache, $3,524 (direct). **Company:** Power Computing, Round Rock, TX; 800-405-7693 or 512-388-6868; http://www.powercc.com/. **Reader Service:** Circle #405.

RACING THE ENGINES / PowerPC 604e fuels PowerTower speed gain

Our comparison of Power Computing's latest models, the PowerPC 604e-based PowerTower 200e and PowerTower 180e, showcases their respective speed advantages over Apple's 604e-based Power Mac 9500/200 and the original PowerTower 180, which was based on a PowerPC 604. All systems were equipped with 32 MB of RAM and were tested using MacBench 3.0, Ziff-Davis' industry-standard benchmark for measuring Mac OS-system performance. MacBench scores are relative to those of a Power Mac 6100/100 with a 250-MB internal hard drive, which is assigned a score of 10 in all tests.



PHOTOGRAPHY / STEVEN UNDERWOOD



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Big Island YoYo

Low-cost add-on extends the functionality of caller ID.

PHOTOGRAPHY / TOM UPTON

TRULY NEW PRODUCTS for computers are rare these days, but Big Island Communications has come up with one that has no competitors. The YoYo is a telecommunications device that marries your phone company's caller-ID service and your Mac to give you more control over incoming and outgoing phone calls. Looking like an oversized mouse, the YoYo plugs into your Mac's ADB port, your phone line, and your phone.

Ordinary caller-ID devices flash the phone number of an incoming call before you answer it, but the YoYo's Mac application, YoYoLand, looks up the number in the Phonebook database, which you create. If it recognizes the number, YoYoLand displays the caller's name and company on your Mac's screen. You then have the option of answering the call or clicking on the Ignore button, which stops the phone from ringing and hands the call off to your answering machine. The YoYo can also announce your calls with a specific sound and icon for each caller or member of a group listed in your Phonebook database.

If you don't want to take calls from your insurance agent during working hours, you can set the YoYo to block calls from certain people at selected times. The blocked calls go directly to your voice-mail or answering machine without ringing your phone. There's also a global blocking feature that lets you forward all incoming calls to your answering machine.

The YoYo Phonebook is a straightforward personal information manager, but it's less flexible than popular PIMs such as Now's Now Contact and TouchBase Pro, and it's limited to 2,000 entries, which rules it out as the be-all contact database for many small-to-mid-sized businesses. Importing and exporting information from most PIMs into the YoYo Phonebook is easy, however. What's more, YoYoLand offers full AppleScript support, so you can automate transfers of data from the Phonebook into a database program.

The YoYo's power goes beyond using caller-ID information. You can use YoYoLand to dial a phone number for you or to send a message to a pager. The software also logs all incoming and outgoing calls you make. If you subscribe to your phone company's voice-mail service, the YoYo notifies you with a flashing

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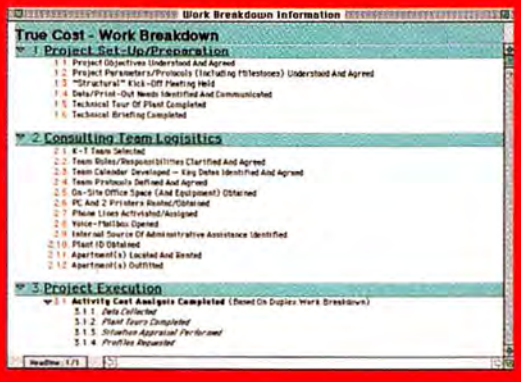

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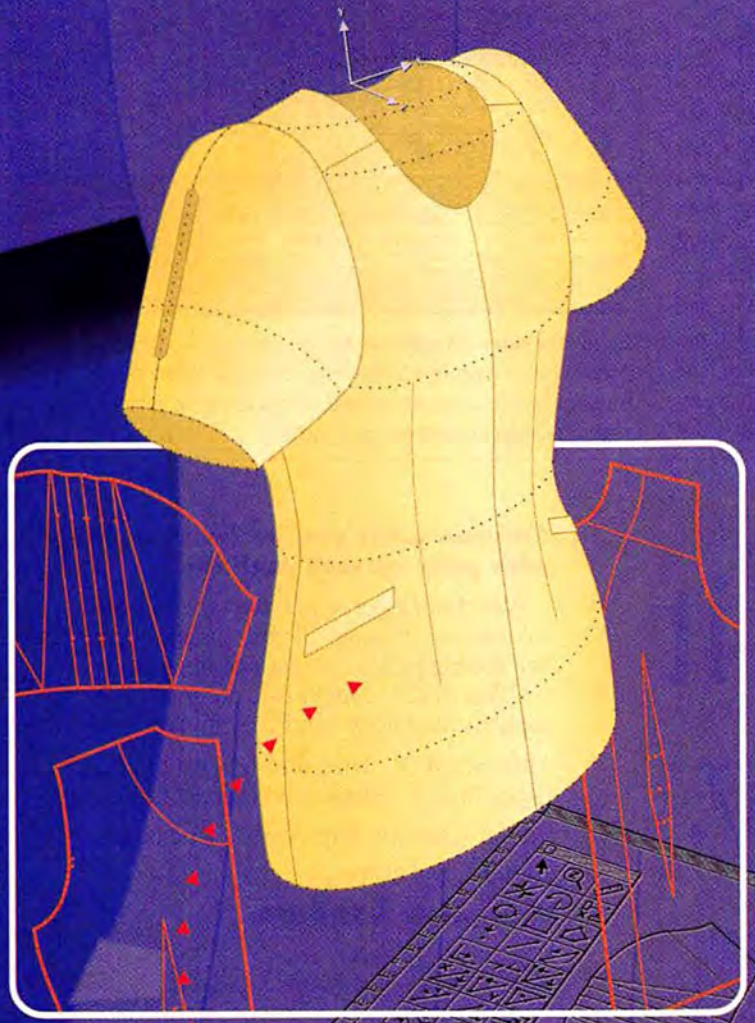

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light when you have a message waiting. The light turns off when you hang up your phone. This feature works without the software, even when the YoYo is not connected to a Mac.

Sophomoric Sounds, Icons

YoYoLand, a 1.0 release, really showed its lack of maturity. Unlike other telephony software, for example, it can autodial only phone numbers stored in its Phonebook database; you can't just type a number you want to use once and have it autodialed. Another problem is the YoYo Menu, which gives you access to YoYoLand features from within any application. Although YoYoLand uses normal, resizable windows, the tear-off menu uses large modal windows, which can't be clicked into the background and which always cover up your application. Even more troublesome is that YoYoLand doesn't support the printing of the Phonebook or the call log, although a beta copy of version 1.0.2 (which should be shipping when you read this) does.

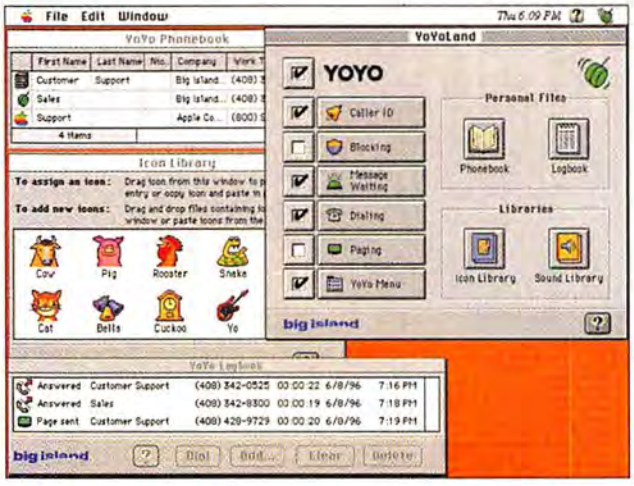
Considering how potentially useful the YoYo is for small businesses, we were surprised that the sounds (and accompanying icons) YoYoLand supplies for assignment to specific callers are silly, even sophomoric. Icons include childish animals; sounds include animal noises and a much too realistic burp. Fortunately, you can drag and drop your own sounds into the Sound Library or record your own from within YoYoLand.

There were also some minor bugs: The installer unnecessarily copied the Macintosh Drag and Drop extension onto a machine running System 7.5.3, which doesn't require it. Also, dialing while simultaneously logging on to a file server can cause a crash.

The Bottom Line

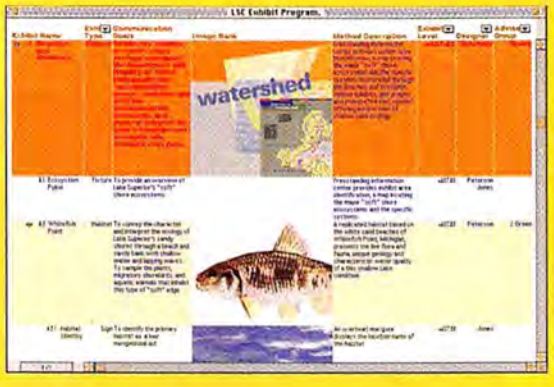
Nothing on the market does what the YoYo does. It introduces new telephony concepts and features that are both innovative and useful. It makes caller ID a more worthwhile service and adds some nice dial-out capabilities. For the most part, the YoYo performed as advertised and wasn't affected by fax/modems on the same phone line. Unfortunately, version 1.0 of the software seems like it was shipped before it was really ready. / John Rizzo

Big Island YoYo, $149.99 (list). **Company:** Big Island Communications, Cupertino, CA; 800-788-7751 or 408-342-8300; http://www.big-island.com/. **Reader Service:** Circle #406.



The YoYo comes with software for harnessing caller ID, including (clockwise from top left) a 2,000-entry address book, the configurable YoYoLand application, a call log, and a set of silly icons you can assign to specific callers the software recognizes.

Look at it this way.



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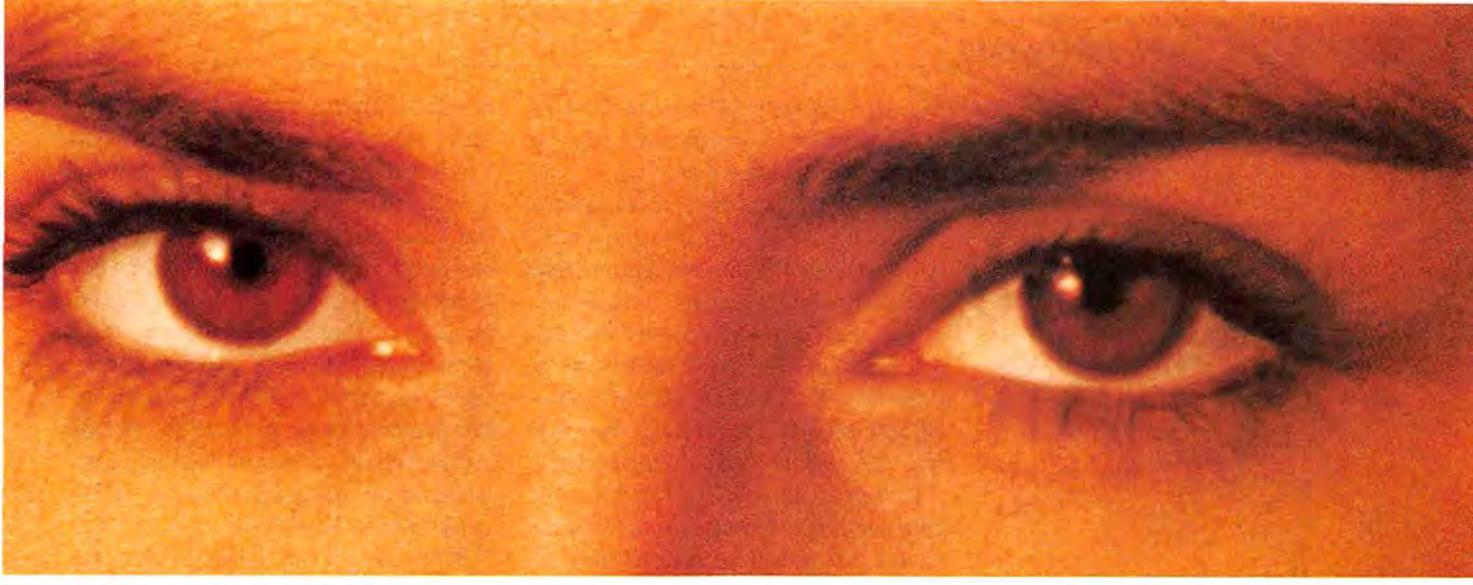

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Radius PrecisionView 17	0.25	1024x768	31-64	16.0"	1	$789
Sony 17seII	0.25	1600x1200	30-85	16.0"	3 P&L, 2 CRT	$963

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DOS-Compatibility Hardware

Apple Power Mac 7200/120 PC Compatible ★★★½

Apple 12-inch PC Compatibility Card ★★★½

Apple 7-inch PC Compatibility Card ★★★

PC-in-a-Mac cards run well — at a steep cost.

APPLE'S NEW PC Compatibility Cards, built around 100-MHz Pentium-class processors, offer the speediest Windows-on-a-Mac option you can buy today. They're far faster than software alternatives such as Insignia's SoftWindows, but they come at a far steeper price. In fact, although their speed compares reasonably well to that of midrange Pentium PCs, so do their price tags: For the price of the costlier (and faster) of the two Compatibility Cards, you could get a fully equipped PC.

Apple's PC Compatibility Cards come in two configurations — a full-sized 12-inch PCI card built around an Intel Pentium processor and a 7-inch card based on a Cyrix 586 processor. The 12-inch card is also available preinstalled in a Power Mac 7200/120 as the Power Mac 7200/120 PC Compatible. Purchasing the prebuilt system saves you about $150 over the cost of the individual components.

Both cards ship with DOS 6.22 and a control panel that lets you toggle between the Mac OS and DOS without restarting. (The cards can run Windows 3.11 and 95, but you have to buy these separately.) You also get a print spooler that supports Windows printer drivers and a Clipboard that lets you cut and paste between the Mac OS and DOS environments — conveniences no "real" PC can offer.

The cards each come with 8 MB of RAM installed and support PC-standard Sound Blaster audio, but they otherwise differ in basic speed characteristics. The 12-inch card's Pentium processor addresses its onboard memory via a 64-bit-wide data path, whereas the 7-inch card's memory controller uses a 32-bit path that's half as fast. And the 12-inch card comes with a 256K Level 2 cache, whereas the 7-inch card has only a 128K L2 cache.

Aside from higher raw-processing speed, the 12-inch card offers a few more advantages over the lower-priced 7-inch model: Its 8 MB of installed RAM is soldered down, and you can use a DIMM slot for expansion up to 72 MB of RAM. The 7-inch card, by contrast, ships with an 8-MB DIMM in its only memory slot, so expanding beyond 8 MB (a practical necessity if you want to run Windows) means scrapping the included DIMM for a higher-capacity (up to 64 MB) one.

Both cards contain complete video-card circuitry for displaying PC graphics. And both use the same ATI Mach 64 video with 1 MB of video RAM installed, but the 12-inch card can accommodate an extra 1 MB of video RAM, for support of millions of colors at higher resolutions — a dealer-installable option.

Installing the cards is a bit tricky, because they share such resources as the CD-ROM drive and audio/video inputs with the Mac. Installing cables to link the cards to these system components is fairly straightforward, and the Apple manuals are clear and well illustrated — but they're geared specifically to

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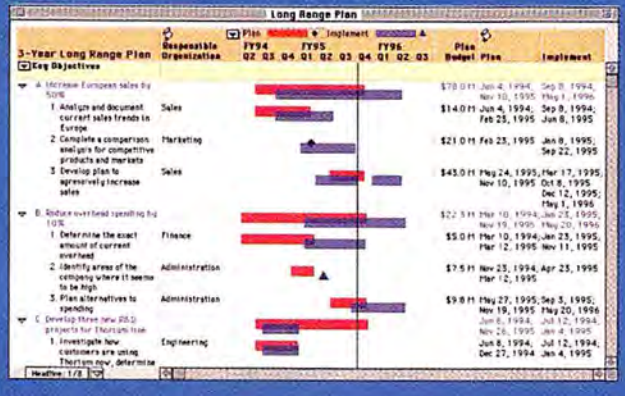

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Apple systems, so if you want to install the cards in a Macintosh clone, you'll have to extrapolate the instructions to your machine's design.

For the most part, the Compatibility Cards work seamlessly with the Mac's hardware peripherals. There are a couple of limitations, however: The cards don't recognize input from your Mac's microphone, and because the Mac doesn't support a two-button mouse, you have to use a kludgey keyboard shortcut for left-button commands.

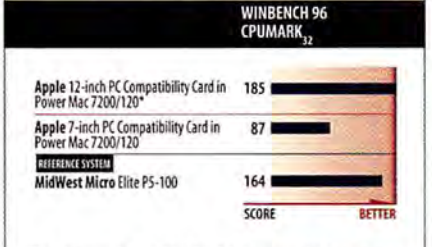
The Bottom Line

Despite their ability to seamlessly weave DOS and Windows with the Mac OS, Apple's PC Compatibility Cards lack many of the advantages of "real" PCs. The Power Mac 7200/120 and PC Compatibility Card bundle offers an easy way to get up and running immediately — but it's a merely middling Mac OS system. Those accustomed to the speed of a 100-MHz Pentium machine will likely be disappointed by the speed of the Cyrix 586-based PC Compatibility Card; it's really a good option only for Mac-compatibles that can't accept full-sized PCI cards. / Nathan Garcia

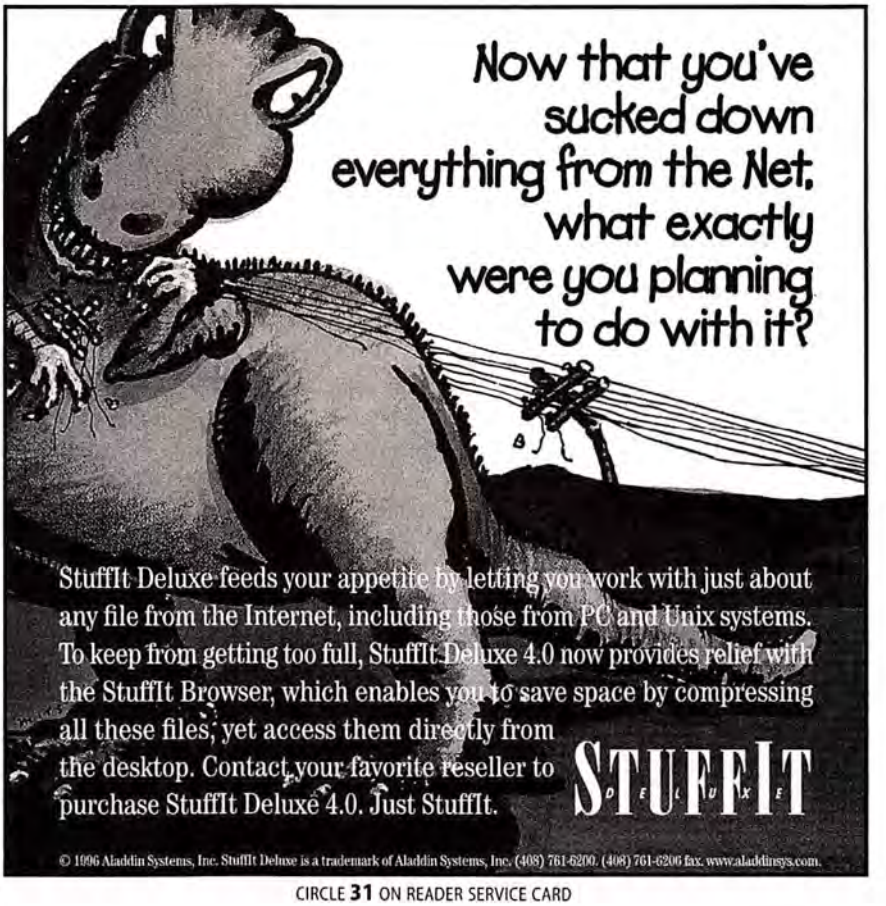
Apple Power Macintosh 7200/120 PC Compatible, $2,799; **Apple 12-inch PC Compatibility Card,** $1,049; **Apple 7-inch PC Compatibility Card,** $799 (list).
Company: Apple Computer, Cupertino, CA; 800-776-2333 or 408-996-1010; http://www.apple.com/.
Reader Service: Circle #407.

WINDOWS SPEED TRIALS / 12-inch Apple card beats midrange PC

We ran Ziff-Davis' industry-standard benchmark test suite developed for gauging PC speed, WinBench 96. We compared the speed of the cards in an 8-MB Power Mac 7200/120 with that of a midlevel 100-MHz Pentium PC, the MidWest Micro Elite P5-100. The Apple Pentium card boasted the fastest CPUmark$_{32}$ score. Apple's Cyrix 586 card brought up the rear, due in large part to its limited L2 cache and its 32-bit-at-a-time memory-bus rate.



*The Power Mac 7200/120 PC Compatible's score was identical to this card's.



CIRCLE **31** ON READER SERVICE CARD

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Digital-Video Cards

Data Translation Media 100qx ★★★★

miro miroMOTION DC20 ★★★½

Truevision Targa 1000 Pro ★★★★

Professional-quality QuickTime capture and playback — for all.

FIVE YEARS AGO, any video maker would have laughed in your face if you told them a Macintosh would be able to capture and output professional-quality video — with CD-quality audio — for under five grand. Not a polite laugh either — a snide, unconvinced "Ha!" But digital video's future is now; prices are dropping, and as three new PCI capture-and-playback cards — Data Translation's Media 100qx, miro's miroMOTION DC20, and Truevision's Targa 1000 Pro — attest, pro-caliber QuickTime is a desktop reality.

All three cards capture video at 60 fields per second, and all are native QuickTime devices, which means that they digitize and compress video signals from your camcorder or videotape recorder (VTR) directly into a format that QuickTime-compatible applications such as Adobe Premiere and After Effects can use. Despite these similarities, the cards differ considerably in overall capability — and their disparate prices reflect those differences.

Each card requires a QuickTime sequencer (such as Adobe Premiere or Avid Videoshop) in order to control video capture and output. Premiere ships with the miro and Data Translation cards, but if you don't have one, you'll have to buy a sequencer (about $300) for the Truevision card. If you haven't already done so, we recommend that you upgrade to QuickTime 2.5: We tested the cards with both QuickTime 2.1 and QuickTime 2.5, and all three of them delivered significantly better results with QuickTime 2.5.

Video Issues

Although all three cards capture video at its full rate of 60 fields per second, the quality of the images captured at that rate depends heavily on the data throughput the card can sustain as it captures the video: The more data getting through, the truer the captured image is. The data rate is also critical to the high-quality playback of your QuickTime movies: When the playback rate is reduced, QuickTime drops movie frames to maintain smooth audio/video synchronization, and this diminishes video quality.

As with all pro digital-video systems, Data Translation and Truevision recommend the use of disk arrays to achieve the best possible capture and output. The miroMOTION DC20 requires less throughput; any decent (and preferably large) AV hard drive should provide the necessary throughput for both audio and video. We tested each card with a MicroNet DataDock and 4200W Array and Jaz Array modules. Each storage system yielded more than enough throughput.

When we examined throughput rates while using Adobe Premiere, we found that the throughput bottleneck was in the cards themselves. The Media 100qx's capture rate maxed out at about 6.5 MB per second — the highest. The Targa 1000 Pro did almost as well, at 5.8 MB per second. The miroMOTION DC20 card captured 3.5 MB per second when we used miro's latest drivers, which allow a "PCI burst mode." These drivers, available free from miro's Web site, vastly improved the video-capture quality.

The miro card's new drivers also enable the DC20 to do something it originally couldn't but that its more expensive rivals always could — preview a video clip on the Mac before capture. This feature is crucial for Mac video creators who don't have an NTSC monitor handy. The DC20's preview video is only 16-bit but is acceptable for simple positioning in order to select your clips' starting and ending points.

The cards' video-output quality was impressive for their prices. Even the miroMOTION DC20, with its low throughput and reliance on Macintosh audio, provided excellent "industrial" quality. The Targa 1000 Pro handled Betacam input and output with no problem and with acceptable loss in signal — good enough for duplication. But the Media 100qx really shined, having clean and sharp quality. This is attributable to the Vincent motherboard at the heart of the Media 100qx — the same board as the entire Media 100 line uses — which provided unparalleled QuickTime-video output.

Using QuickTime 2.5 seemed to enhance the playback quality of all the cards, particularly the Targa 1000 Pro. According to Apple, the current version of QuickTime allows a playback throughput of up to 7 MB per second, a big jump from version 2.1, which allowed a maximum of 4 MB per second.

Sound Concerns

The Media 100qx and the Targa 1000 Pro have built-in hardware for digitizing movie audio along with video. The miroMOTION DC20 instead relies on the Mac's audio inputs for capturing sound. The Media 100qx can handle eight tracks, and the Targa 1000 Pro can output four. If you get the component option for the Media 100qx, you can use balanced audio input, which reduces line noise. The Media 100qx without the breakout box and the Targa 1000 Pro accept unbalanced RCA audio-input lines.

Before we installed QuickTime 2.5, all the cards suffered from a tendency to lose audio/video synchronization after about 30 to 60 seconds of continuous file capture. Using QuickTime 2.5 greatly reduced the problem.

The Media 100qx's audio was particularly outstanding — maybe attributable to the stereo signal coming in via dual professional XLR cables. All eight channels of audio play and can be edited in real time, without compression. This is the only card we would use in place of dedicated digital-audio hardware in a pinch.

High-quality QuickTime for the masses: the Data Translation Media 100qx.

PHOTOGRAPHY / STEVE UNDERWOOD

The miroMOTION DC20 relies on the Mac's audio bus for 16-bit captures. Even with QuickTime 2.5, a noticeable drift occurs between the audio and video streams after a few minutes, and it increases with time. If you have a professional VTR, you can get around this problem by dubbing the audio in after laying down the video track, but it's one more step in an already laborious process.

For connecting the cards to your audio- and video-input sources, the Media 100qx and the Targa 1000 Pro each come with a snake cable that streams from the back of the video card and plugs into your tape decks. This arrangement is far more practical than that of the miroMOTION DC20, which has S-video input and output plugs on the back of the card itself — just plugging in your cables could easily knock the card loose. The Media 100qx's component option provides the best connection of all — a rack-mountable breakout box that can easily integrate with most professional video-deck racks.

The Bottom Line

For those who are just getting into video and don't have a lot to spend, the miroMOTION DC20 is unbeatable. The first 60-field card for under $1,000, it comes with Adobe Premiere and does a fine job with S-video signals. For working pros on tight budgets, the Targa 1000 Pro is the least-expensive component-level card in the Mac realm, and it provides accelerated transitions in Premiere. If you want amazing QuickTime-video quality without springing for a five-figure setup, you should go with the Media 100qx with the component option. Although none of these cards can deliver broadcast-quality video, all three can yield video that's more than adequate for CD-ROM playback, in-house training videos, and stunning home movies. Each offers excellent value for its price, and collectively, the cards provide an array of affordable choices for Mac video pros. / Kennedy Grey

Data Translation Media 100qx, base system $4,995; with component option, $6,995 (list). **Company:** Data Translation, Marlboro, MA; 800-525-8528 or 508-460-1600; http://www.datx.com/. **Reader Service:** Circle #408.

miro miroMOTION DC20, $799 (list). **Company:** miro Computer Products, Palo Alto, CA; 800-249-6476 or 415-855-0950; http://www.miro.com/. **Reader Service:** Circle #409.

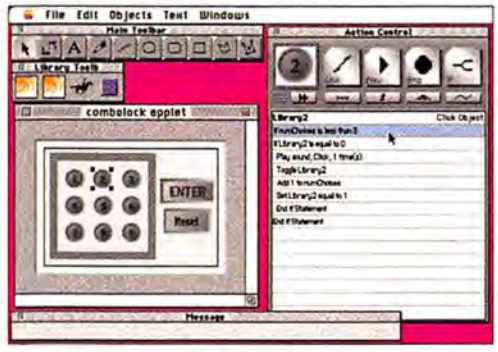
Truevision Targa 1000 Pro, $3,995 (list). **Company:** Truevision, Santa Clara, CA; 800-522-8783 or 408-562-4200; http://www.truevision.com/. **Reader Service:** Circle #410.

WebBurst

Java programming without code still isn't painless.

ONE OF THE MOST HYPED technologies around today, Java enables the creation of cross-platform, interactive programs that run over the Web. One problem: It's a *programming language.* Typical computer users aren't any more likely to write Java applets for the Web than they are to write business cards in C++. How do the rest of us put Java to work?

That's where PowerProduction's WebBurst comes in. It enables you to create interactive, graphical Java applets without writing any Java code: You lay out your applet by arranging buttons, fields, and pop-up menus in WebBurst's design window and then associate those elements with text or numbers or preexisting behaviors to create an animated or interactive program. When you're done, WebBurst exports a compiled Java applet, with its images and media automatically converted to online formats (GIF and .au).



You assign behaviors to graphic elements of Java applets (such as the 2 key shown here) by using WebBurst's Action Control palette.

WebBurst isn't intended to compete with Java development environments such as Symantec's Café or Metrowerk's CodeWarrior. But Mac-based artists and interactive-content developers can use it to get their ideas and media into Java without writing code.

To create a Java applet in WebBurst, you begin in the applet frame window — the workspace in which you assemble an applet's visible elements. You can import existing graphics and manipulate them with a series of palette-based tools or use the tools to create new elements from scratch.

WebBurst also lets you create libraries for storing frequently used image files (such as buttons) and sequences of images that together form an animation. WebBurst's libraries could be easier to manage, but they accept files and folders dragged in from the Finder so importing existing art is very easy.

Once you've got your applet's look nailed down, use WebBurst's Action Control palette to assign behavior and functionality to the visual elements. Each object in the applet frame window can have an Action list, which determines its behavior in response to events such as mouse clicks or the applet starting up. For example, you can use the Action Control palette to draw a path for an object to follow (using the Path tool) and then tell the object to move along that path at a certain speed when it's clicked on. The Action Control palette lets you set up a variety of behaviors, including playing sounds, linking to other URLs or applets, starting an animation, and even having an object animate forward and backward in response to the mouse. Action lists can also contain IF statements that permit some conditional interactivity to be built into the applet.

The disadvantage is that WebBurst's capabilities are obscured by a glossy but nearly impenetrable interface. The groupings of behaviors within pop-up menus are sometimes oddly organized, for example, and some functions (such as editing paths) are very difficult.

If you've successfully tackled an animation or authoring program such as Director or mTropolis, you should be able to puzzle through WebBurst, but it has no online help and the terse documentation contains some unfortunate omissions. WebBurst's interface can also be frustrating: The more interactivity you build into an applet, the more you'll wish pop-up menus had never been invented.

The Bottom Line

WebBurst is a promising newcomer, but it's still got some version-1.0 awkwardness to shake off. If PowerProduction continues to build on WebBurst's solid foundation, the program should be a first-class tool by the time Java comes of age. / Geoff Duncan

WebBurst 1.0, $299 (list). **Company:** PowerProduction Software, Hermosa Beach, CA; 310-937-4411; http://www.powerproduction.com/. **Reader Service:** Circle #411.

NetDoubler

★★★★

File-transfer accelerator does its name proud.

IT'S NO MAGIC BULLET, but NetDoubler does something every administrator desperately wants: It speeds up network file transfers. Network-hardware vendor Asanté created NetDoubler as a free software add-on for its Fast Ethernet cards and also sells it separately for $99. The company claims that the software lives up to its name, and from what we've seen, it does.

NetDoubler Basics

NetDoubler is a control panel that must be installed in every Mac you're trying to speed up. (If NetDoubler is installed in only one of two Macs involved in a file transfer, the copy is performed at normal speed.) You can install NetDoubler as either server or client software; in either case, its interface is identical. The server need not be your file server, but you must use NetDoubler's server option on all machines *from* which you wish to transfer or open files. Since each NetDoubler package contains both server and client software, we recommend that you use the server option on all machines you think may hold files other users will need.

Once installed, NetDoubler is completely transparent. You can move and open files normally, using the Finder. The only indication NetDoubler is at work is a flashing icon on the menu bar during transfers — and far snappier transfer speeds.

Under the Hood

Open Transport has been disappointing to some network-hardware and -software vendors, but it's NetDoubler's secret weapon. (NetDoubler requires Open Transport 1.0.8 to work with PCI Macs and version 1.1 for NuBus systems. It's hardware-independent.) Because Open Transport eliminates dependence on AppleTalk, NetDoubler can use more-efficient and faster protocols to transfer files on a Macintosh network. NetDoubler accelerates data transfer by substituting TCP/IP for AppleTalk and AFP (AppleTalk Filing Protocol), which are used by AppleShare and System 7's File Sharing. If TCP/IP is not present on the network, the software will revert to ADSP (Apple Data Stream Protocol), a venerable Apple protocol most often associated with network backup and communication with non-Macintosh networking hardware (routers and remote-access servers, for example). TCP/IP and ADSP are both faster than AppleTalk, because they move files in larger packets and because they're completely Open Transport-native. NetDoubler doesn't accelerate printing or access to AppleTalk-only network software, because these applications can't function without AppleTalk.

Putting NetDoubler to the Test

MacUser Labs put NetDoubler through its paces, not only to find out if file-transfer speed actually doubles but also to see which network configurations yield the most-significant speed improvements with NetDoubler installed. To that end, we performed each test with built-in Ethernet and then with two well-regarded PCI Fast Ethernet cards (see charts).

The most basic network-speed test is a large-file transfer. Large files, whatever the protocol used, always copy more efficiently than a folder full of smaller files, even if their total size is the same. When we used System 7's File Sharing to copy a 10-MB Adobe Photoshop file from one Mac (configured as a NetDoubler server) to the other, we found that NetDoubler nearly halved the transfer time. Adding an Asanté or Sonic Systems Fast Ethernet card in each Mac gave an even greater speed bump.

Because TCP/IP file transfers have less network overhead than those with AppleTalk, we wanted to see how well NetDoubler — which relies on TCP/IP, even when moving files via the Finder — performed with the Mac OS taken out of the equation. We used Farallon's Timbuktu software to transfer our Photoshop file from server to client, using the software's built-in TCP/IP option. We were surprised to find that although NetDoubler continued to double the speed of network file transfers, using Timbuktu was faster than using the Finder only in our built-in Ethernet test — with and without NetDoubler. When we compared the Timbuktu results with the Finder Copy results with Fast Ethernet, we found that Finder copies were actually faster whether NetDoubler was installed or not. (That means you can reap many of the benefits of Fast Ethernet *without* having to switch from AppleTalk to IP.)

Since Asanté bundles NetDoubler with its Fast Ethernet cards, we were curious to know how the software performed with another card. Sonic Systems' card performed adequately in our recent roundup of Fast Ethernet adapters (see "Not So Fast Ethernet," October '96, page 87), so we used it to repeat our NetDoubler tests and found that the differences were negligible.

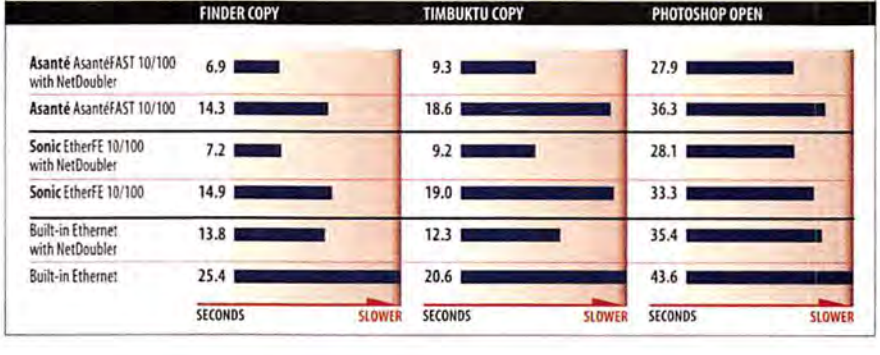
The Bottom Line

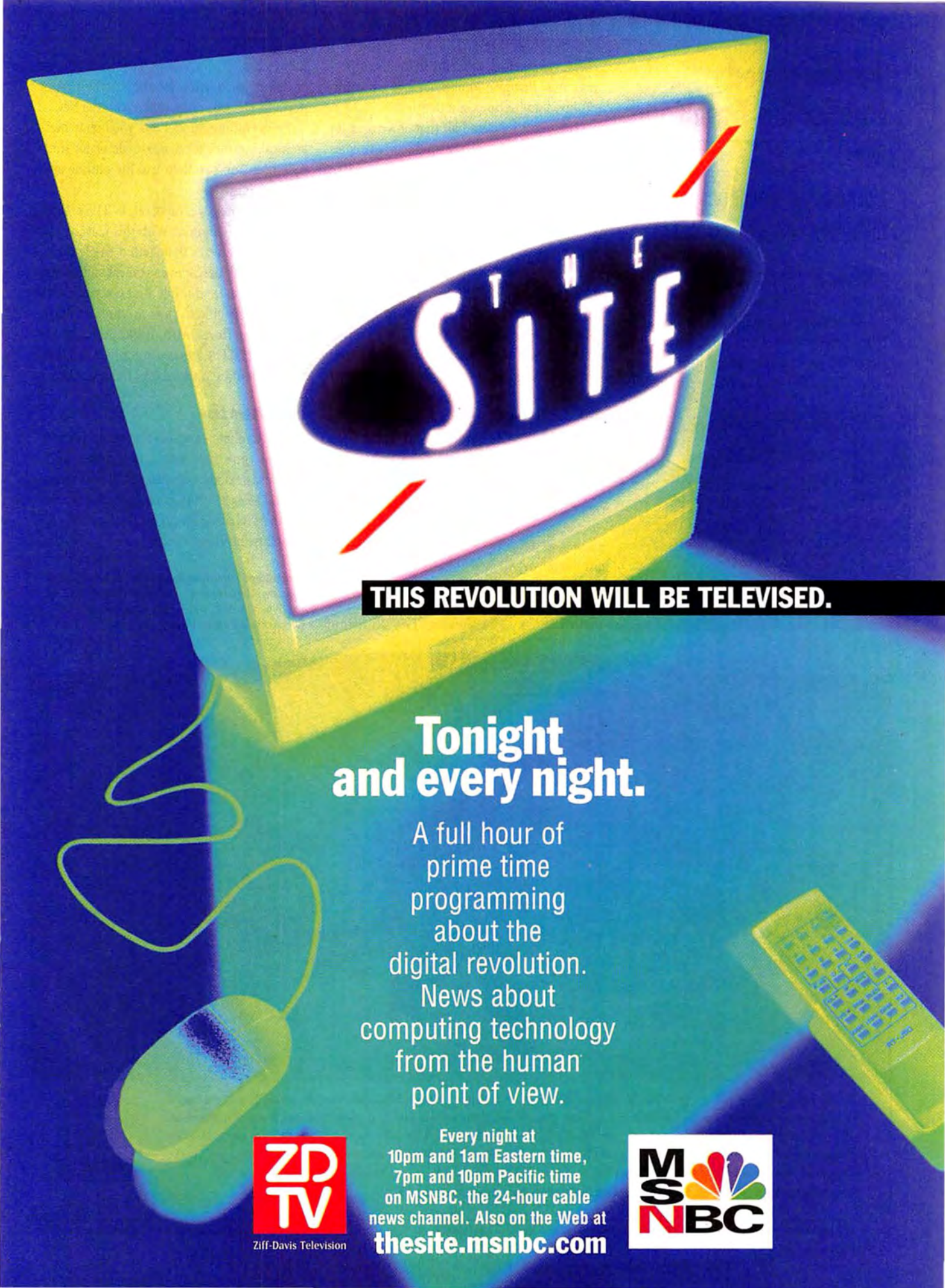
At $99 (free with the excellent AsantéFAST 10/100 Fast Ethernet card), NetDoubler offers a relatively inexpensive way to speed large-file transfers — from a graphics server to a client, for example. For that reason, it's a great investment for critical applications. If you're hoping to speed up all network operations with NetDoubler, however, you may be disappointed, since the software's magic is most visible for large-file transfers. / Shelly Brisbin

NetDoubler 1.x, $99 (list). **Company:** Asanté Technologies, San Jose, CA; 800-662-9686 or 408-435-8388; http://www.asante.com/. **Reader Service:** Circle #412.

DOUBLE OR NOTHING / NetDoubler makes fast copies

Our test platforms consisted of two Power Mac 7500s running System 7.5.3 and Open Transport 1.1, one configured as a server and the other as a client. We performed all tests with NetDoubler's TCP/IP option enabled. NetDoubler doubled the speed of all our file transfers, but the improvement was less dramatic when we opened a 10-MB Photoshop file over the network.

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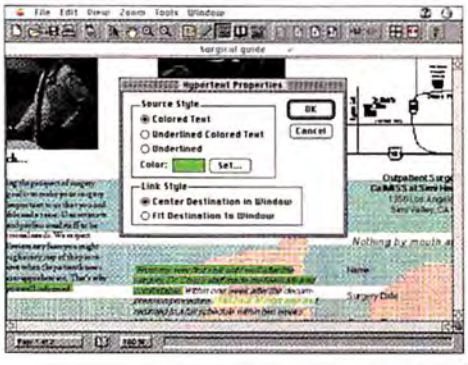
Tumbleweed Publishing Essentials

★★★½

Electronic-document underdog takes aim at Adobe Acrobat.

YOU CAN BUY SEVERAL flavors of portable-electronic-document software, but only Adobe Acrobat has had real success, judging by the proliferation of Acrobat files on the Net. Nevertheless, Tumbleweed Publishing Essentials (TPE), a five-piece software package that creates portable documents in the Envoy format, may just give Adobe Acrobat for Workgroups some serious competition.

TPE's cost is about half that of Acrobat for Workgroups, although the products have comparable features. Like Acrobat's PDFWriter, which generates PDF files from virtually any Mac app, TPE's Envoy Writer extension lets you create Envoy portable documents in the same way you print docs to paper. The files look as good as Acrobat PDF files and are actually a bit smaller. TPE can create PostScript, EPS, and even Acrobat PDF files in addition to those in Envoy. With TPE's Envoy Viewer, you can add bookmarks, thumbnails, and hypertext links to your Envoy documents.



With Tumbleweed Software's Tumbleweed Publishing Essentials, you can create portable electronic documents for distribution over any network, including the Internet.

Others can use the free Envoy Runtime Viewer to look at the files, although they'll need to buy the $79 Tumbleweed Extension package of Envoy plug-ins to be able to have a full-text search engine, navigate outlines, and display images full-screen with the Runtime Viewer. The Runtime Viewer is also available as a browser plug-in or helper application for the distribution of portable electronic documents on the Net.

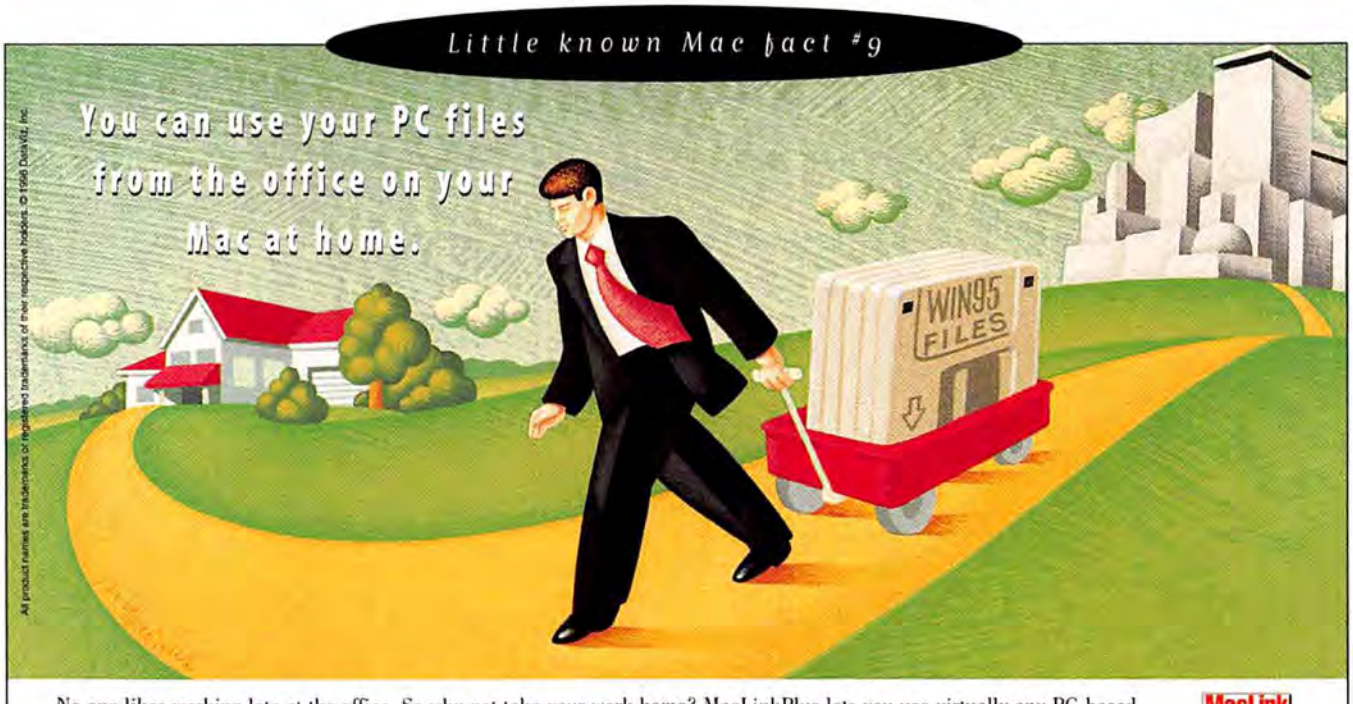
TPE's Outline Builder lets you create hierarchical outlines for a single file or for multiple files. You can then use the outline as a table of contents.

More impressive, however, is TPE's Tumbleweed Index Builder. With this feature, you can design indexes that span a single document, several files, or even several folders. You can even create multiple indexes, each with word lists specific to various kinds of document collections. And unlike Acrobat for Workgroups, TPE lets you index files and folders with names longer than 11 characters.

The Bottom Line

Adobe Acrobat 3.0, which was on the horizon at press time, may match or surpass TPE's price and flexibility advantages. But at the moment, TPE is a versatile, inexpensive alternative to Acrobat for Workgroups, especially for company intranets. / William Harrel

Tumbleweed Publishing Essentials 1.0.2, $695 (list). **Company:** Tumbleweed Software, Redwood City, CA; 800-696-1978 or 415-363-7022; http://www.twcorp.com/. **Reader Service:** Circle #413.



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LaserMerge Electronic Paper

3½

Merge letterhead, bar codes, and watermarks into documents.

DESPITE TECHNOLOGY'S ADVANCES, printing letters on your business stationery is still a hassle. If you want to print several two-page letters, for example, you have to carefully load your printer with sheets of letterhead alternated with blank sheets and pray the printer doesn't misfeed. Alternatively, you can print your own letterhead, but then you have to make letterhead templates individually for each program from which you'll be printing — that is, unless you have MindGate's LaserMerge Electronic Paper.

Universal Templates

In a nutshell, LaserMerge lets you create templates that merge with *any* document — created within any application — at print time. The templates don't have to be letterhead: They can be any text or graphics, including logos, scanned signatures, bar codes, invoice forms, and watermarks. All you do is click on the LaserMerge button in the Print dialog box, choose the template you want, preview the merged document, and print. The print utility works well with PostScript and QuickDraw printers as well as with fax-software drivers. LaserMerge works by intercepting a program's output before it goes to the printer driver.

LaserMerge comes with the Designer utility, which lets you create templates. In the Designer, you import images, type, and formatted text and then combine and lay out the elements to create your stationery. LaserMerge comes with several basic templates for printing business cards, envelope labels, and many other types of forms. Once you've designed and saved the templates, they're available whenever you print a document.

Beyond creating stationery, LaserMerge provides several other useful printing functions. You can, for example, print thumbnails of your documents in 2-, 4-, 6-, 8-, 10-, and 12-up layout spreads, giving you a great way to proof the overall look of long documents. In addition, LaserMerge lets you control the density of ink or toner, which not only saves consumables expenses but also lets you fine-tune the darkness of watermarks and silhouettes. In addition, you can colorize individual layers for some interesting effects, particularly for stamps or watermarks.

For all its abilities, remember that forms created in LaserMerge are only as good as the printer you use to produce them. Letterheads and logos generated on inkjet or even laser printers won't be as impressive as those on offset-printed stationery. Still, LaserMerge-generated documents suffice for faxes and a variety of internal business documents.

The Bottom Line

Even though it may not resolve the hassle of printing on business stationery, LaserMerge is a useful print utility overall. At the very least, it can help eliminate the great paper shuffle with networked printers, since multiple users can merge templates and print on plain paper and don't have to remember to select the correct paper trays or make trips to a printer to load specific forms. / William Harrel

LaserMerge Electronic Paper 2.1, $95 (list). **Company:** MindGate Technologies, Flintville, TN; 800-648-6840 or 615-937-6800; http://www.mindgate.com/. **Reader Service:** Circle #414.

CIRCLE 62 ON READER SERVICE CARD

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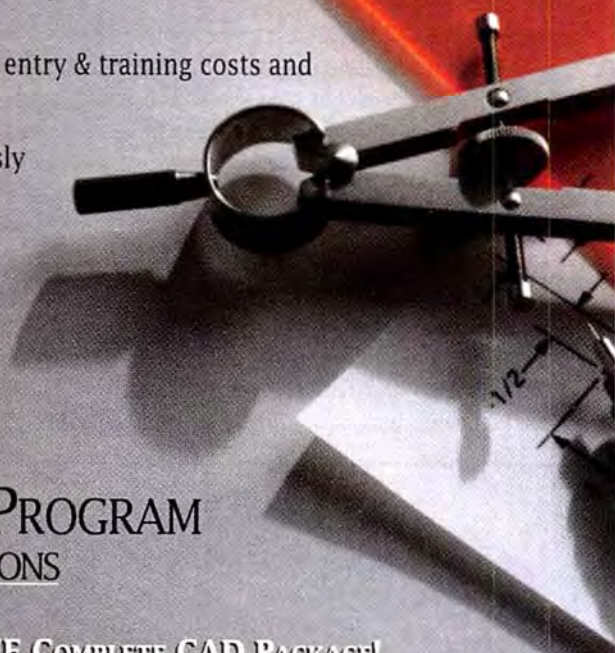

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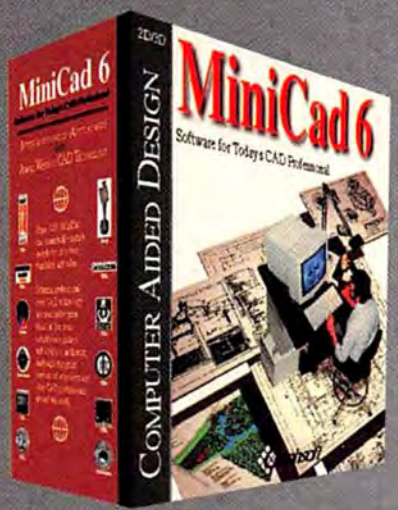

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CIRCLE 10 ON READER SERVICE CARD

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Acecad Acecat III

Diminutive but hard-to-configure graphics tablet draws a blank.

ATTRACTIVELY PRICED at $99, Acecad's new graphics tablet, the Acecat III, is an intriguing mouse alternative. But a limited feature set and awkward hardware setup hamstring the ergonomically well-designed product.

The Acecat's 5-x-5-inch drawing area is centered on a mousepad-sized base. A slight tilt and built-in wrist rest provide a comfortable working surface for desktop or lap. The Acecat is also the only small graphics tablet that gives you a clear plastic overlay for holding small originals in place while you trace them. The included stylus has two side buttons you can easily program to execute custom keystroke macros or click sequences.

Like all graphics tablets, the Acecat uses absolute positioning. This means that the tablet's drawing area maps directly to your monitor, so if you point to a place on the tablet, your cursor jumps to the analogous spot on the screen. You can simulate a mouse click by tapping the stylus against the tablet.

The Acecat's most noticeable physical feature is also its most controversial: The stylus is tethered to the tablet. The tether carries power from the tablet, so the stylus isn't saddled with the heavy gonna-die-sometime batteries most cordless styli use. And the tether keeps the stylus from getting lost. On the other hand, you have to flick the tether out of the drawing area frequently and it adds to the cord spaghetti already on your desk.

Another drawback will trouble the artistically inclined. The tablet is not pressure-sensitive. With a pressure-sensitive tablet and a compliant application, such as Fractal Design's Dabbler, when you press the stylus harder on the tablet, the line you're drawing becomes thicker or more opaque, so you can realistically simulate such drawing tools as magic markers, chalk, and colored pencils.

But the real deal breaker is the tablet's annoying setup. The Acecat is a port hog: It occupies an ADB port and a serial port, so you have to evict either a printer or a modem if you have both. And hardware juggling isn't the only problem. If you plug the tablet into the printer port, you have to disable AppleTalk. If you use the modem port, you have to disable other serial-device extensions or drivers.

PHOTOGRAPHY / STEVE UNDERWOOD

The Bottom Line

Although its price is enticing, the Acecat III's awkward setup will cause daily headaches for anyone who has a modem or a printer. For an extra $50, you can get the similarly sized Wacom ArtPad II, which gives you an ADB-only setup your serial devices can live with, along with pressure sensitivity and a cordless, batteryless stylus. / Shelley Cryan

Acecad Acecat III, $99 (street). **Company:** Acecad, Monterey, CA; 800-676-4223 or 408-655-1900; http://www.acecad.com/. **Reader Service:** Circle #415.

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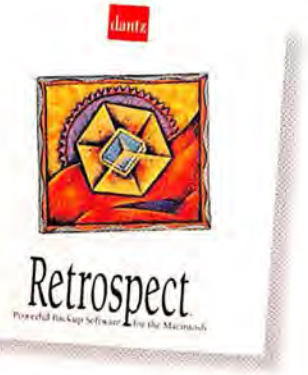

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On Guard

Security with more configuration options than you bargained for.

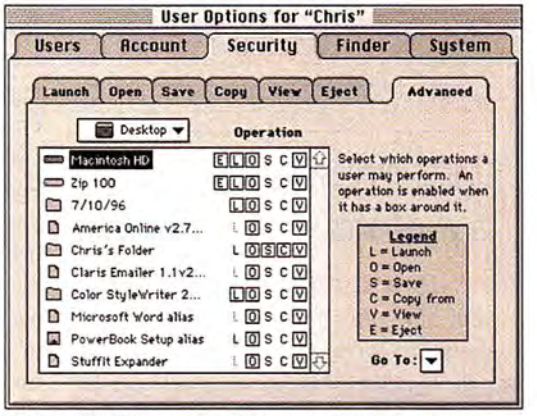
PARANOID? IF YOU'RE concerned that others may want to tamper with your computer data, your fears may be justified.

One way to protect your Mac against infiltration is to employ the services of a security software package, such as Power On Software's On Guard. An all-purpose program for home, school, or office use, On Guard lets you specify who may view, access, and change files contained on hard disks, floppies, CD-ROMs, and removable media on drives connected to individual Macs and across a network. You can also prevent users from copying files from or to floppy disks; booting with extensions off; taking screen shots; force-quitting; accessing the Chooser, System Folder, or control panels; and viewing protected files when the Mac has been booted from a remote disk.

After you've installed the On Guard control panel and extension, the only difference you'll see in the Mac's standard desktop is an additional Finder menu-bar item you use to configure the program and others use to log on and enter their passwords. You can choose from an impressive list of protection options, and On Guard works as advertised — provided you can configure it correctly.

Because of On Guard's many configuration options, abundance of dialog boxes, and lack of templates for typical labs and offices, you may find yourself tweaking the program long after the initial setup. This is irksome given the program's intended users — teachers and home users who don't need professional features such as encryption.

Using tricks that would occur to a typical Mac-savvy individual — holding down the Shift key to disable extensions, booting from a Disk Tools floppy — we were unable to break into an On Guard-protected disk. However, employing a few sneakier methods (which required the use of an external Zip drive and additional disk-utility software), we skirted On Guard with little difficulty. We informed Power On of the breaches and were told that version 2.1.1 will render these methods futile.



On Guard's Advanced settings window lets you individually protect every folder and file on your Mac.

The Bottom Line

We would like Power On to add templates for typical office and lab setups and offer fewer dialog boxes in future versions of On Guard. But for the time being — provided you have the patience to set it up properly — the application should provide all the basic security any typical home, school, or office requires.

/ Christopher Breen

On Guard 2.0.4, $99 (list). **Company:** Power On Software, Sherrodsville, OH; 800-344-9160 or 612-879-9190; http://www.poweronsw.com/. **Reader Service:** Circle #416.

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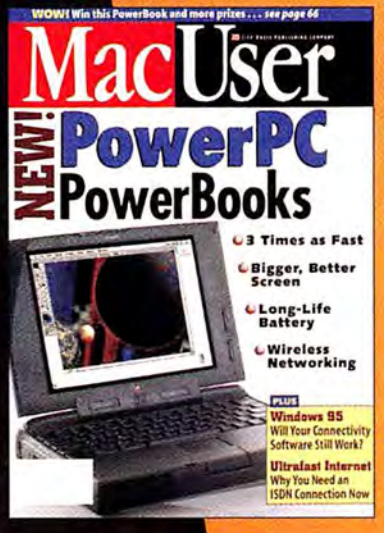

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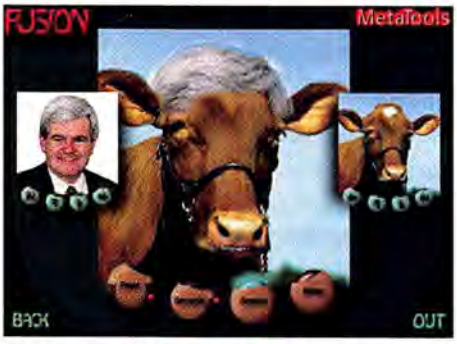
Kai's Power Goo

★★★★

Digital images can become putty in your hands.

REMEMBER PICKING UP newspaper photos with Silly Putty? You could stretch and twist the images to create freaky fun-house effects.



"Mooot Gingrich" was "painted" in Kai's Power Goo's Fusion Room.

Kai's Power Goo (KPG), from MetaTools, brings that concept to the digital age by turning any PICT image into virtual taffy — and even animating the changes you subject it to.

KPG's main work area — dubbed the Goo Room — is easy to understand: You open an image in the program, select one of two sets of brush tools, and start distorting the image. The first set of nine brushes — the ones we enjoyed most — let you click-drag anywhere in the image to push and pull it around as if it were finger paint. These brushes vary in the size of the areas they affect and in the way they affect colors. The second set of nine brushes applies global distortions to the image.

Animation of these distortions is straightforward: At any point in your image manipulation, you can click on a frame in a filmstriplike window under the main workspace and the image is entered in that frame. You can string as many frames as you like together to make a looping movie of your image as it morphs. (The movie is saved in MetaTools' proprietary Goovie format, which keeps the animation files extremely small.)

Less successful than the Goo Room is a second work area, the Fusion Room, in which you can merge two photos by "painting" portions of one into the other. You can get realistic (and humorous) results, but it takes lots of patience, partly because there's only one level of undo. (KPG's skimpy documentation claims that you can animate the Fusion Room process by exporting successive images to the Goo Room, but we gave up after several abortive tries.)

The Bottom Line

Despite the shortcomings of the Fusion Room tools, Kai's Power Goo is addictive fun. Graphics pros who need occasional distorted images will find it easy to use, but its main audience will be dabblers who want to mess around with family photos. And at under $50, KPG is justifiable purely as a toy. / Jim Shatz-Akin

Kai's Power Goo 1.0, $49 (estimated street). **Company:** MetaTools, Carpinteria, CA; 800-472-9025 or 805-566-6200; http://www.metatools.com/. **Reader Service:** Circle #417.

Sharp QA-2500

★★★

This high-resolution panel is less than Mac-fluent.

TODAY'S POWERBOOKS and Mac OS desktop systems offer a resolution of more than 640 x 480 pixels, and LCD projection panels are catching up. One such offering, the Sharp QA-2500, boasts truly impressive image quality and built-in speakers to boot. Its support for the Mac OS, however, is clearly an afterthought, as evidenced by the lack of bundled Mac cables and the limited support for Macintosh-standard resolutions.

The QA-2500 projection panel features a 10.4-inch active-matrix LCD screen with 1,024 x 768 pixels at 24 bits. It supports resolutions of 640 x 480, 832 x 624, 1,024 x 768, and 1,152 x 870 pixels on the Macintosh and delivers high-contrast images with great color fidelity.

As with all LCD panels, the Sharp QA-2500's images are only as bright as the overhead projector you place them on. Sharp recommends that you use a metal-halide projector for the best possible results. The image quality was generally very good, although we did observe some slight syncing problems, producing artifacts in small text and slight visible noise in dithered images at all resolutions except 832 x 624 pixels, for which syncing was rock solid.

Sharp includes a backlit remote control that accesses all projection-pad controls. The remote also controls the QA-2500's built-in pointer, simple drawing tools (for highlighting areas on presentations), and an adjustable red horizontal-bar overlay that's useful for identifying a particular line of text. The remote has VCR controls as well as a tiny joysticklike mouse control that you must buy a separate accessory cable to use.

The remote also controls the volume of two small, amplified stereo speakers built into the QA-2500's top surface. The speakers are leaps and bounds better than the puny speakers in a PowerBook, but for large rooms, you'll want to connect a set of amplified speakers.

Images Not to Scale

The QA-2500's multiple-resolution support is limited in its usefulness, because the panel lacks a variable zoom. At 1,152 x 870 pixels, a portion of the image is cut off and you have to scroll around, using the remote control, to see the rest. At the lower Macintosh resolutions of 832 x 624 and 640 x 480 pixels, by contrast, the active image is centered within a black border area. At its price, the QA-2500 should scale popular Macintosh resolutions to the full size of its LCD panel.

Setting Up

The QA-2500 comes with cables for VGA PCs and non-Macintosh workstations as well as with audio cables. We tried using several Macintosh-to-VGA adapters with the supplied VGA cable with no luck — the special Mac cable ($150) is a must. So is the optional Macintosh "monitor" cable ($85), if you want to connect a standard display monitor in tandem with the QA-2500. Once the cables are hooked up, you select a resolution via the panel's cumbersome on-screen menu and then reboot your Macintosh to activate that resolution — a bit of a nuisance.

The Bottom Line

The Sharp QA-2500 is a full-featured performer — once you have all the right cables. The built-in speakers are a nice plus, especially if you're using the panel with a PowerBook. But similarly priced offerings from Proxima and InFocus deliver similar features — and they come with Macintosh cables in the box. / Jeffrey S. Pittelkau

Sharp QA-2500, $7,999 (list). **Company:** Sharp Electronics, Mahwah, NJ; 800-237-4277 or 201-529-8200; http://www.sharp-usa.com/. **Reader Service:** Circle #418.

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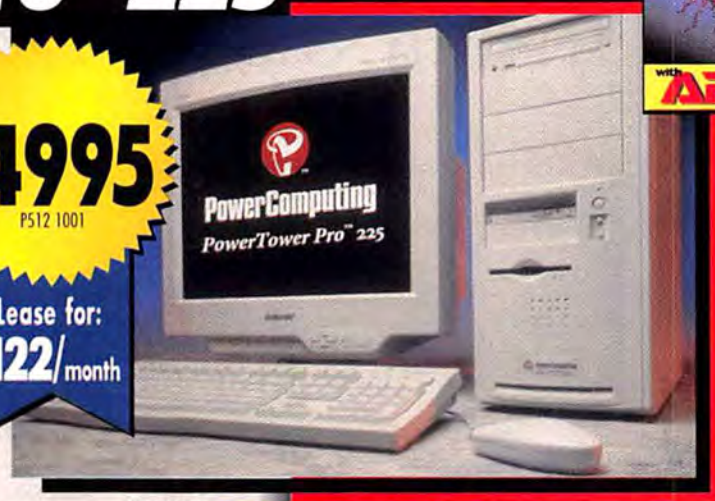

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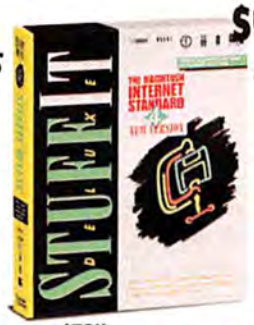

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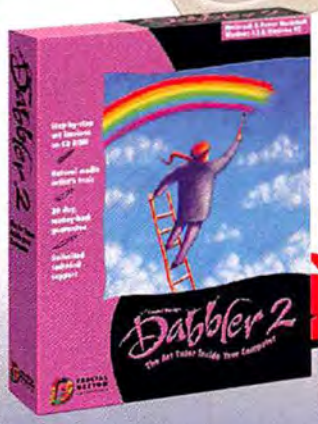

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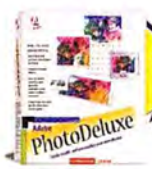

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DIGITAL CAMERAS

DO THE LATEST DIGITAL FIELD CAMERAS OFFER MUCH-NEEDED IMPROVEMENTS IN EASE OF USE AND IMAGE QUALITY? OUR IMAGING EXPERTS FIND OUT.

BY BRUCE FRASER

Exposed

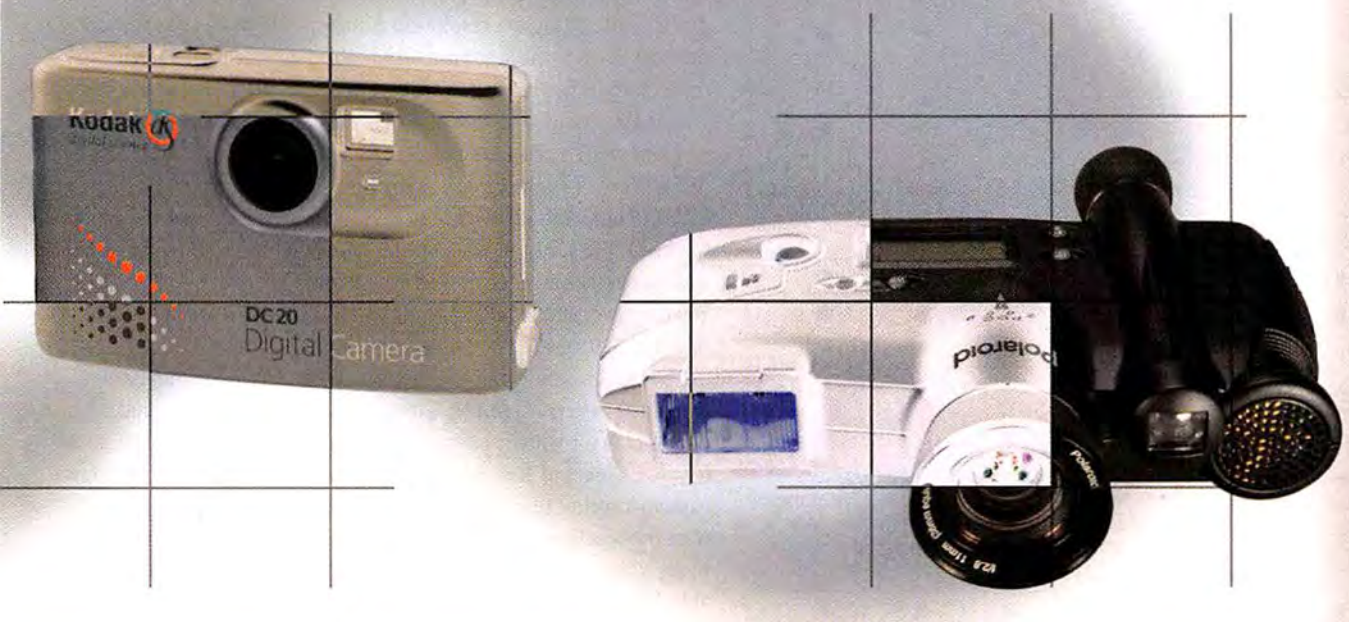
A BRIGHTER PICTURE IS what we expected when we revisited digital cameras this year. But with a few exceptions, we were again disappointed. Having tested the latest in field cameras, we find that one thing is certain: Using a digital camera still involves big compromises in image quality, ease of use, software tools, and price.

We evaluated nine of the newest field cameras, ranging in price from $395 to almost $10,000. Each camera fell into one of three categories: consumer point-and-shoot cameras, which produce low-resolution (320 x 240 pixels standard) images; midrange cameras, which create images with a resolution of 640 x 480 pixels or higher; and megapixel cameras, which use over a million pixels for creating images.

All the cameras use a *striped area array* to capture images — each element in the CCD (charge-coupled device) array captures either red, green, or blue information for a single pixel. When you open the image, using the bundled software, the software interpolates information for the other two color channels from neighboring pixels.

We used the cameras to shoot photos under a wide variety of conditions, to determine image-output quality. None of the cameras came *even close* to producing 35mm-film quality, limiting their usefulness to on-screen display or to print reproduction at small sizes. One obvious use for these cameras is for capturing low-resolution images for multimedia and for the Web (see the "Focus on the Web" sidebar).

PHOTO ILLUSTRATION / GIAMPIERO BENVENUTI



We also evaluated the user-friendliness of each camera — how easy it is to use in the field as well as to download images to your Mac. In general, we found delayed shutter reactions, awkward body constructions, and inconvenient download processes — although some did make effective use of built-in features and did have simple download procedures.

The beauty of a digital camera is that it provides direct access to images in digital form — no film processing or scanning is required. If direct access is your most pressing need and digital-camera image quality is suitable for your requirements, you may save time and money with one of the new digital cameras reviewed here.

CHEAP SHOTS

Two of the cameras we tested are intended for the consumer market. We found that these cameras can't produce the image quality of film output. If that's a major concern, you're better off investing in a point-and-shoot 35mm-film camera and scanning the pictures to get them into digital form.

BEHIND THE LENS. The Casio QV-30 and the Kodak Digital Science DC20 are the only two cameras we tested that make an attempt to bring digital photography to the masses.

The $995 Casio QV-30 digital camera is a disappointment, especially when compared to its predecessor, the QV-10. The QV-30 has the same 320-x-240-pixel resolution, the same questionable image quality, and the same 96-image storage capacity as the QV-10. The QV-30 has a larger body than the QV-10, and it does have a two-position wide/telephoto lens — the only functional difference we could find between the two cameras. You can also use the QV-30 as a presentation device, since you can upload images to it and play them back on a TV. But you can do this equally well with the smaller, cheaper QV-10.

Kodak's Digital Science DC20 camera, on the other hand, is the least expensive digital camera we've encountered, with a street price under $350. It's small enough to slip into a shirt pocket; weighs about 6 ounces with a battery; and has only three controls — an on/off switch, a shutter button, and an erase button. Exposure is automatic and the lens is "focus-free," so it's very much a point-and-shoot camera.

IMAGE QUALITY. The QV-30's output quality is, again, similar to the QV-10's. Images at 320-x-240-pixel resolution appear coarse and pixelated. You can use the higher resolution (480 x 240 pixels), but it's obtained by interpolation, so the visual results are unsatisfactory.

The DC20's image-output quality is surprisingly good, but it still doesn't match that of a film camera. Images taken in daylight show reasonable color balance and relatively few undesirable artifacts. Images taken under low-light conditions contain more noise and sometimes have blocky artifacts caused by JPEG compression.

GETTING THE PICTURE. The QV-30 has no optical viewfinder. Like the QV-10, it relies instead on an LCD. The QV-30's LCD is larger than that of the QV-10, but the same number of pixels are spread over a wider area. As a result, the viewfinder is dimmer and virtually unusable in bright sunlight — you simply can't see what you're shooting.

Taking pictures with the DC20 couldn't be easier — you turn it on, frame the subject in the viewfinder, and press the shutter. The viewfinder is sharp and bright, and the shutter trips almost instantly. The camera supports two resolutions (320 x 240 pixels and 493 x 373 pixels), but setting the resolution is inconvenient — you must connect the DC20 to the Mac via a serial cable and modify the settings by using the bundled software. Once you've set the resolution, you're stuck with it for an entire session, because the camera can't store different resolutions. The camera's 1-MB internal memory holds 16 standard-resolution or 8 high-resolution images.

DOWNLOADING AND SOFTWARE. The QV-30's bundled software is similar to the QV-10's, but it lets you back up the entire contents of the camera to disk and open the camera contents as a digital contact sheet. You can save individual images as either PICT or TIFF, at a resolution of either 320 x 240 or 640 x 480 pixels.

The DC20's bundled software, Kodak PhotoEnhancer (Fun Edition), contains a variety of templates for calendars, greeting cards, and other documents for which you can use images directly from the DC20. A less fun aspect of the software is that you cannot back up the raw camera-capture files directly to disk; instead, you must let the software process the raw image into its final form before you can do anything with it. The difference in storage capacity required is considerable: High-resolution processed files occupy about 500K, whereas raw images occupy about 50K.

If you can live with the relatively low resolution and the limited storage (you may find yourself having to download images to the Mac

THE BOTTOM LINE

THE LATEST IN FIELD CAMERAS won't break new ground in image quality or ease of use, but we have seen some progress from when we last reviewed digital cameras. In rating these cameras, we compared similar types and rated each camera for price, image quality, software tools, and ease of use. Two cameras stood out from the rest of the pack.

+ / OUTSTANDING ● / ACCEPTABLE − / POOR

RATING	PRODUCT	PRICE	IMAGE QUALITY	SOFTWARE TOOLS	EASE OF USE
CONSUMER CAMERAS					
★★★½	Kodak Digital Science DC20	+	●	●	+
★★	Casio QV-30	−	−	−	●
MIDRANGE CAMERAS					
★★★★	**Kodak Digital Science DC50**	+	+	+	●
	BEST BUY — A camera that combines good image quality and software with a good price, the DC50 ($395 list) provided better color accuracy than its twin, the Chinon ES-3000.				
★★★	Chinon ES-3000	+	●	−	●
★★★	Fujix DS-220	●	●	●	●
★★½	Ricoh RDC-1	−	●	●	−
MEGAPIXEL CAMERAS					
★★★★	**Minolta RD-175**	−	●	+	●
	BEST BUY — The Minolta RD-175 ($9,995 list) has a Minolta Maxxum 400 autofocus 35mm SLR body, so you get the flexibility of using Maxxum lenses and accessories. Although the highlights in its output were more blown out than the Polaroid's, the camera's usability made us prefer it.				
★★★½	Agfa ActionCam	−	●	●	●
★★★½	Polaroid PDC-2000	●	+	−	−

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

FIRST LOOK: A KODAK MOMENT / the EOS•DCS1c offers 35mm-film quality

THE LATEST DIGITAL CAMERA from Kodak has something that most of the cameras we tested lack — the ability to capture high-quality digital images with the ease and versatility of a 35mm-film camera. The new $30,000 Kodak EOS•DCS1c has a Canon EOS-1N body and incorporates the same imager as the Kodak DCS 460 (which has a Nikon body).

The EOS•DCS1c has a 2,000-x-3,000-pixel CCD array, creating 18-MB image files. Images are stored on Type III PC Cards, with Kodak providing 170-MB drives at additional cost. You can attach the EOS•DCS1c to your Mac as a SCSI device, or you can use a PC Card reader.

Most of the cameras we tested have fixed lenses with limited zoom ranges. The EOS•DCS1c lets you access a wide variety of professional-quality lenses, ranging from three tilt-shift lenses to wide-angle lenses as large as 14mm. You can also get telephoto lenses and a large stable of zoom lenses. Many lenses feature Canon's exclusive autofocusing Ultrasonic Motors and low-dispersion glass.

With the EOS•DCS1c connected to a PowerBook, you can preview an image on-screen to see if it's what you need — you don't have to wait for film to be processed to see if your shooting session was adequate, hoping you can re-create the shot's lighting and mood if it wasn't.

When we examined output from the EOS•DCS1c, we found artifacts, but by applying Gaussian Blur and Unsharp Mask filters in Adobe Photoshop, we were able to clean the images up easily. Some of our output exhibited lens flare running down the left side and bottom edge; however, the area was small enough to be easily cropped out in Photoshop. You could correct the problem by using "hot-mirror" lens filters.

The EOS•DCS1c generates images equal or superior to those from any other camera in its class. Professional photographers who've been using the Canon EOS-1N system can enjoy all the features of that system and the benefits of digital imaging. / Rick Oldano

more often than you'd like), you'll find that the DC20 is a decent inexpensive camera. The QV-30's dual-position lens seems to account for the camera's higher price tag, and it isn't worth it. Where the QV-10 was cute, the QV-30 is simply unattractive — definitely a step in the wrong direction.

MIDRANGE CAMERAS

Four of the cameras we tested capture images at a resolution of 640 x 480 pixels or higher, storing them on PC Cards. These four are designed for more-experienced photographers, but we found a great deal of variation among them in terms of image quality and ease of use.

BEHIND THE LENS. As you work with the $1,800 Ricoh RDC-1, you quickly realize that it's very complex. The camera captures still images at a resolution of 768 x 576 pixels and stores them on proprietary cards that aren't readable by PC Card readers because they don't conform to the ATA standard (Ricoh sells a 2-MB card for $299, an 8-MB card for $639, and a 24-MB card for $1,699). To download images, you must connect the camera to a Mac, which requires the use of a $59 RDT-1 communications adapter.

The Ricoh RDC-1 can also capture 10 seconds of audio or up to 5 seconds of full-motion video. The RDP-1 video-playback adapter is standard equipment, but you'll also need the $219 AK-1 accessory kit, which includes the proprietary rechargeable batteries and battery charger/AC adapter. An optional DM-1 LCD is $539. Ricoh sells a bundle that includes the camera, LCD, accessory kit, communications adapter, and an 8-MB card for $3,099.

Except for the difference in body color, the $999 Chinon ES-3000 and the $995 Kodak Digital Science DC50 look identical — the bodies, controls, and optics are the same on both. But there are a couple of important differences between the two. Capturing images at a resolution of 756 x 504 pixels, the DC50 has a slightly higher-resolution sensor than the ES-3000, which captures images at 640 x 480 pixels. The DC50 uses ATA-compliant PC Cards that can be read by plugging them into a PC Card reader. The ES-3000 must be connected to the Mac's serial port, since it doesn't use ATA-compliant PC Cards. The cameras' zoom ranges cover an equivalent of 38mm to 114mm (Chinon) or 37mm to 111mm (Kodak). The lens is almost identical in both cameras; the difference is due to the DC50's slightly larger sensor area. Kodak includes an AC adapter and a 5-MB PC Card as part of the package; both are options for the Chinon ES-3000.

The $1,200 Fujix DS-220 captures 640-x-480-pixel images and boasts an autofocus dual-position 36/72mm lens coupled to the optical viewfinder. It's the same general size and shape as the Kodak DC50 and the Chinon ES-3000, but it offers more controls, including exposure compensation in 1/3-stop increments and variable aperture. An LCD, available as an option, can function as a playback device and a viewfinder. We preferred using the camera with only the optical viewfinder — it's adjustable, and the camera becomes unwieldy with the LCD attached.

The one area in which the DS-220 excels is macro photography when you use the optional $750 close-up adapter kit. Although pricey, the close-up kit offers off-axis flash and a set of three close-up lenses that allow focus down to 3 inches, a capability none of the other cameras in this category can match.

IMAGE QUALITY. The Ricoh RDC-1's images are quite good, although the flash has a tendency to blow out highlights.

The difference in the sensors in the ES-3000 and the DC50 doesn't drastically affect image quality, but the DC50's white balance seems to provide truer color, with less tendency to oversaturate.

The images from the DS-220 have quite good color and dynamic range, but they lack sharpness. A hefty application of Photoshop's Unsharp Mask filter helps some, but the images are much fuzzier than the output from the other cameras. We even mounted the camera on a tripod to see if camera shake (the inability to hold the camera steady as you shoot) contributed to the problem but found no improvement.

GETTING THE PICTURE. We used the Ricoh RDC-1 without the LCD, because it made for a smaller and more comfortable package. The camera has no power-in port, so you must attach either the LCD or the video-playback unit in order to recharge the batteries. And if you do opt to use the LCD, you must remove it to load a PC Card. We noticed that the motor driving the zoom lens had quite a bit of backlash — we often had to zoom to one extreme and then back off to the desired setting before it would stay put.

The boxy shape of the ES-3000 and the DC50 makes them difficult to hold, but when we compared tripod-mounted and handheld shots,

EVERY PICTURE TELLS A STORY / **output samples**

TO TEST THE CAMERAS' image-output quality, we took several photos of various subjects under various conditions. We then evaluated the output for color accuracy and detail. None of the images shown here have been color-corrected.

We found that the megapixel cameras gave the best-looking output, the consumer cameras' output placed at the bottom end of the quality scale, and the midrange cameras filled out the middle of the scale.

Compared to that of 35mm-film cameras, digital cameras produce low-resolution output. For best results, you need to reproduce the images at a reduced size or display them only on-screen.

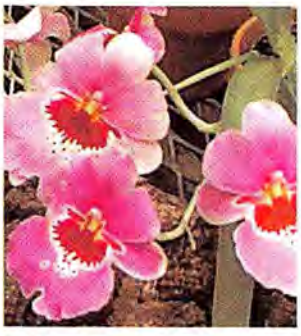
MIDRANGE CAMERAS

CHINON ES-3000

The ES-3000's output is oversaturated and also has a heavy color cast.

FUJIX DS-220

The Fujix DS-220's output has good color balance and a reasonable dynamic range, but images exhibit a noticeable lack of sharpness.



KODAK DIGITAL SCIENCE DC50

The DC50's output is slightly oversaturated. Overall, the image quality is pretty good — the best of the midrange cameras we tested.

RICOH RDC-1

This camera produces a pleasant-looking image, but the color is off — remember, that purple orchid is supposed to be pink.

we found that camera shake wasn't a problem. Pressing the shutter halfway allows the autofocus and the autoexposure to lock in, at which point a beep tells you the camera is ready. Once the camera is ready, the shutter release is almost instantaneous. The Macro mode allows focus as close as 19 inches, but we found that the viewfinder gave severe parallax distortion, making the composition of macro images difficult. The subject almost invariably ended up off-center.

When using the Fujix DS-220, you get both an audible and a visual confirmation when the focus and the exposure are locked. The shutter release is instantaneous. The camera creates JPEG files that are directly readable by Adobe Photoshop and by most other applications that can read JPEG files.

DOWNLOADING AND SOFTWARE. Connecting the Ricoh RDC-1 to the Mac is quite a production. First, you must connect the serial cable to the RDT-1 communications adapter and to the computer, and then you attach the RDT-1 to the camera, after first removing a small door that covers the camera contacts. The door will almost inevitably get lost after a week or two. Next, you must turn the camera on to play, hold the self-timer button down until you get a beep, and then switch the camera to record. Next, you must move the zoom lever to FWD, to select the Aux port, and press the shutter button. You then repeat the procedure once more, to select the baud rate. If you don't have the LCD connected to the camera, you're flying blind through the whole process. Once you've gone through these maneuvers, you can copy the raw camera files to disk, using the DU-1 software.

The Ricoh software can open a folder full of images as a contact sheet, and you can then open individual images and save them as PICT, TIFF, JPEG, or bitmapped files. The software lets you rotate images and apply either of two specialized filters for removing artifacts, but it lacks any other image-editing features. We found ourselves wishing for a Photoshop plug-in.

Kodak's software is considerably more capable than Chinon's, with basic but effective editing capabilities. More important, the Kodak software can open a folder of backed-up camera files from disk as a contact sheet. Chinon's software only allows you to open camera files one at a time, unless they're actually resident in the camera.

The software that comes with the Fujix DS-220 is ImageAXS, a capable image database that can be hot-linked to the image-editing application of your choice. The Fuji software is the only utility that lets you save files in JPEG format.

CONSUMER CAMERAS

CASIO QV-30

The pink orchid in our image looks more like a purple one. This image was taken at a resolution of 320 x 240 pixels; going to 640 x 480 pixels produced a pixelated image.

KODAK DIGITAL SCIENCE DC20

The color is more accurate than with the QV-30, but the image has a blue cast. With the DC20's limited capabilities, we wouldn't be able to take this picture in low light.

MEGAPIXEL CAMERAS

MINOLTA RDC-175

Images from the Agfa ActionCam and Minolta RDC-175 are nicer than the Polaroid images, but the color isn't as good — highlights are blown out.

POLAROID PDC-2000

The Polaroid camera's output is beautiful. The color accuracy is dead on, although the contrast is a little soft.

FOCUS ON THE WEB / **point, shoot, and upload?**

THANKS TO THE WORLD WIDE WEB, digital cameras aren't just for photographers and imaging experts. Anyone designing Web pages will want to take advantage of a digital camera's ability to shoot images directly in digital format. Using a digital camera is convenient and fast, and all those we tested for this report can provide adequate image quality.

Not one of the cameras stands out as being especially Web-savvy, however. Editing the output is unavoidable — you'll need to perform some color correction and downsampling (reduction of the image area and resolution) before you post the pictures on the Web.

The guidelines for buying a camera for Web photos are the same as for buying a camera in general. Some things you should consider are

- The **subjects** you want to shoot. Are they people, places, or things? Will they be static or moving?
- The **conditions** of your photo sessions. Will they be indoors or outdoors? Day or night? Natural or artificial light?
- The **color tones** of your photos. Will you take pictures with lots of highlights? Shadows? Natural tones?
- The **features** you'll need. Do you want to be able to change lenses and adjust settings? Or do you simply want to point-and-shoot?

Once you've taken your pictures, you'll need to color-correct and downsample them. The Kodak Digital Science DC20 and the Casio QV-30 can provide basic images, but you'll need to tweak them for color and sharpness. You'll get better image-quality results by using any of the midrange cameras we tested, but you'll still need to downsample the images. And using a megapixel camera for Web photos is simply overkill.

The file format in which you save your images is also important. The two most common file formats supported by Web browsers are JPEG and GIF. Only one camera we tested, the Fujix DS-220, lets you save output in JPEG format in the camera. With the other cameras, you'll have to perform the translation in an image-editing application or in the camera's bundled software (the Minolta and Polaroid cameras come with Adobe Photoshop plug-ins).

Which file format should you use? Use GIF when your photos have transparent effects. With most other photos, you'll want to use JPEG. For more details on Web graphics and file formats, check out "Shrinking Web Graphics" (August '96, page 100). / Roman Loyola

Features of Digital Cameras

✓ MacUser BEST BUY	CONSUMER CAMERAS		MIDRANGE CAMERAS			
	CASIO QV-30	KODAK DIGITAL SCIENCE DC20	CHINON ES-3000	FUJIX DS-220	✓ KODAK DIGITAL SCIENCE DC50	RICOH RDC-1
List price	$995	$395	$999	$1,200	$995	$1,800
Maximum resolution	480 x 240 pixels	493 x 373 pixels	640 x 480 pixels	640 x 480 pixels	756 x 504 pixels	768 x 576 pixels
Number of images stored	96	16 high-quality, 8 standard	10 high-quality, 40 standard	20 high-quality, 40 standard	28 high-quality, 88 standard	82 standard (8-MB card)*
Lens	fixed, with wide/telephoto lens	fixed	fixed, with 38 – 114mm zoom range	fixed, 36/72mm dual-position	fixed, with 37 – 111mm zoom range	fixed, with 7.1 – 21.3mm zoom range
Software supplied	Casio QV-Mac	PhotoEnhancer (Fun Edition)	ES-3000	ImageAXS	PhotoEnhancer	DU-1 2.00E
White-balance options	automatic	automatic	automatic	automatic	automatic	automatic
Removable storage				●	●	●
ATA compatibility	NA	NA		●	●	
Saves raw files	●		●	●	●	●
Company	Casio Dover, NJ 800-962-2746 201-361-5400 http://www.casio-usa.com/	Eastman Kodak Rochester, NY 800-235-6325 716-724-4000 http://www.kodak.com/	Chinon Torrance, CA 800-441-0222 310-533-0274	Fuji Photo Film U.S.A. Elmsford, NY 800-378-3854 914-789-8100 http://www.fujifilm.com/	Eastman Kodak Rochester, NY 800-235-6325 716-724-4000 http://www.kodak.com/	Ricoh Sparks, NV 800-225-1899 702-352-1600 http://www.ricohcpg.com

*Can record video. †Adobe Photoshop plug-in also included.

MEGAPIXEL CAMERAS

We also looked at three megapixel cameras. These cameras capture images of over a million pixels, resulting in output quality good enough for printing. But both the output and the cameras are far from perfect.

BEHIND THE LENS. The $3,695 Polaroid PDC-2000 is sold in three versions, with different storage capabilities. The tethered version has no internal storage, relying instead on the host computer; the second version has fixed internal storage for 40 images at a resolution of 1,600 x 1,200 pixels, and the third stores 60 images at 800 x 600 pixels.

The Agfa ActionCam and Minolta RD-175 were the most expensive cameras we tested. They capture images at 1,528 x 1,146 pixels. Each is based on a Minolta Maxxum 400 autofocus 35mm SLR body, which is nestled in a large plastic housing that holds a PC Card, a SCSI port, and a rechargeable camcorder-type battery. Each takes a full range of Minolta Maxxum lenses and accessories; uses the camera's built-in metering; and lets you use program, aperture-priority, or shutter-priority modes. There's nothing to prevent you from using fully manual settings, save that no metering information shows up in the viewfinder.

IMAGE QUALITY. The Polaroid camera can take spectacular images, with excellent color and a noticeably wider dynamic range than any other megapixel camera we've used. It routinely held highlights on shots that other cameras invariably blew out. Polaroid has incorporated some radical technology in the sensor and in the software that turns the raw camera capture into a processed image, and it seems to work well. But the PDC-2000 leaves a great deal to be desired in terms of usability.

The Agfa and Minolta cameras produced some very good images. Although they tended to blow the highlights out more than the Polaroid camera did, we preferred their greater usability. The most obvious comparison is with the Kodak DCS 420, which we tested last year (see "Photo Opportunities," November '95, page 82). We'd have to say that the Agfa and Minolta cameras produce better image quality, having superior color balance and less tendency to produce undesirable image artifacts.

GETTING THE PICTURE. The PDC-2000 suffers from some glaring flaws. The viewfinder is blurry; displays obvious chromatic aberration; and has an exit pupil so small that unless your eye is positioned exactly behind the viewfinder, you can't see anything through it. The shutter invokes a lengthy autofocus and autoexposure routine, and unlike most autofocus cameras, the PDC-2000 doesn't let you lock the autofocus by depressing the shutter halfway. The result is you have no idea when a picture will be taken. It's impossible to take shots of fast-moving objects — you have no idea where the subject will end up in the frame. It's also difficult to hold the camera steady — we noticed a significant increase in sharpness when we mounted it on a tripod.

We found several shortcomings with the Agfa and Minolta cameras as well. The sensors (they're three-chip cameras) cover a smaller image area than does 35mm film, so rather than putting a mask in the existing viewfinder, as Kodak did with the DCS 420, Minolta opted to replace the viewfinder with one that displays the correct image area. Unfortunately, the replacement is of poor quality, causing heavy chromatic aberration. The viewfinder is too blurry to allow you to use manual focus — you simply can't tell by looking through it whether or not the subject is in focus.

DOWNLOADING AND SOFTWARE. The PDC-2000's software doesn't let you save the raw files. This is more annoying with the PDC-2000 than it

BOOKMARK

RELATED INTERNET SITES

MacUser's Web Edition
For information on other digital cameras, check out last year's story, which includes mouse ratings and image samples from 16 different cameras.

GO TO **http://www.zdnet.com/macuser/mu_1196/features/cameras.html**

MEGAPIXEL CAMERAS		
AGFA ACTIONCAM	✓ MINOLTA RD-175	POLAROID PDC-2000
$9,499	$9,995	$3,695
1,528 x 1,146 pixels	1,528 x 1,146 pixels	1,600 x 1,200 pixels
114	114	40 (as tested)
28 – 80mm zoom range, Maxxum-compatible	28 – 80mm zoom range, Maxxum-compatible	fixed
ActionCam	RDGrabber†	Polaroid PDC-2000 Direct†
automatic	automatic	automatic
●	●	
●	●	NA
●	●	
Agfa Wilmington, MA 800-685-4271 508-658-5600 http://www.agfa.com/	Minolta Ramsey, NJ 800-964-6658 201-825-4000 http://www.minolta.com/	Polaroid Cambridge, MA 800-816-2611 716-256-4436 http://www.polaroid.com/

would be with other cameras, because its two resolutions are created by interpreting the same raw file in two ways: The lower resolution uses less interpolation of both color and spatial data, so there are valid reasons for saving both resolutions of the same image. To do so, however, means that you end up using almost 7 MB of disk space, instead of just over 1 MB for the raw file. The lack of removable storage is also frustrating: The camera connects to the Mac's SCSI interface via a 25-pin cable, and it must be the last item in the chain.

The software bundled with the Agfa camera needs improvement too. Although you can open images on a PC Card by using a reader, you can't initialize the card unless it's in the camera and the camera is connected to the SCSI chain. The software opens all the images on the disk as a contact sheet, but you can open the full-sized images only one at a time. With the stand-alone application, you have to quit and relaunch it to get back to the contact sheet.

We also found that the software applies some overly heavy edge sharpening that makes some images difficult to salvage. We were able to take a peek at a beta version of new Minolta software that corrects most of these problems, but at present, it's unclear whether Agfa will have access to the software fixes.

We didn't find the Agfa-specific software, a light version of its FotoTune color-management system, particularly useful unless we were shooting under controlled lighting conditions in a studio. We give the nod to the Minolta camera package as the better value.

PARTING SHOT

If you can forgive the shortcomings, any of these cameras may be useful, but we'd pick two, the Kodak Digital Science DC50 and the Minolta RD-175. The DC50 offers a good combination of price, output quality, and software. For those who need high-resolution images, the Minolta RD-175 provides good-quality output. Experienced photographers will appreciate its usability and the ability to use Minolta Maxxum lenses and accessories. We can't recommend any of the consumer cameras we tested — the QV-30 is overpriced for what you get, and you can buy a quality 35mm-film camera for the same price as the Kodak DC20.

We're still waiting for the ideal digital camera. As with last year's crop, this year's set still involves plenty of compromises. Unless you need digital images in a hurry, you'd probably be better served by a decent 35mm camera and Photo CD scans.

Contributing editor Bruce Fraser is a photographer and coauthor of *Real World Photoshop 3.0* (Peachpit Press). MacUser Labs project leader Rick Oldano contributed to this report.

ON THE HORIZON

OLYMPUS WILL SOON offer its first digital camera, the Olympus D-200L. This point-and-shoot camera captures full-color images at a resolution of 640 x 480 pixels, and its 4-MB internal memory stores 24 high-quality or 96 normal-quality images. The camera features both an optical viewfinder and a 1.8-inch LCD viewer, which can be used as a playback screen. The fixed-focus wide-angle lens can focus from 2.5 feet to infinity. The camera controls allow selective deletion of stored images, and the built-in automatic flash provides several program modes, including red-eye reduction. Adobe's PhotoDeluxe software is included in the package, which has a target street price of $599. 800-347-4027 or 516-844-5000.

Sony Electronics' DKC-ID1 Digital Still Camera captures images at 768 x 576 pixels and uses ATA-compliant Type II PC Cards for storage. A 10-MB card holds 140 normal-mode images, using standard JPEG compression, or 40 fine-mode images. The DKC-ID1 has a camcorder-type LCD viewfinder and a 12x zoom lens that covers a range equivalent to 38mm to 460mm on a 35mm-film camera. Exposure controls include programmed EV compensation (±3EV in 1/3-stop increments) and an optional shutter-priority mode (the shutter's top speed is 1/4,000 per second). The camera has a suggested retail price of $1,795. 800-488-7669 or 941-768-7669.

Apple has announced the Apple Image Capture Platform, a cross-platform architecture for digital cameras. The AICP includes an embedded, in-camera microprocessor and a multitasking operating system. It also has cross-platform APIs (application-programming interfaces) specifically for digital cameras and other image-capture devices that have an embedded microprocessor such as Motorola's new MPC823 chip. Cameras equipped with this chip will be able to carry out such tasks as in-camera time-lapse photography, connecting directly to the Internet, and running in-camera filters — without being connected to a host computer.

Apple's QuickTime IC software is the core of AICP. It provides a standard method for applications to talk to digital cameras, freeing camera developers from the burden of developing their own camera-specific software. Apple hasn't announced any specific partnerships with camera vendors, but at the Worldwide Developers Conference, it showed Casio and Minolta cameras using the QuickTime IC APIs. Watch for camera announcements in the coming months. / Bruce Fraser

Drawing CONCLUSIONS

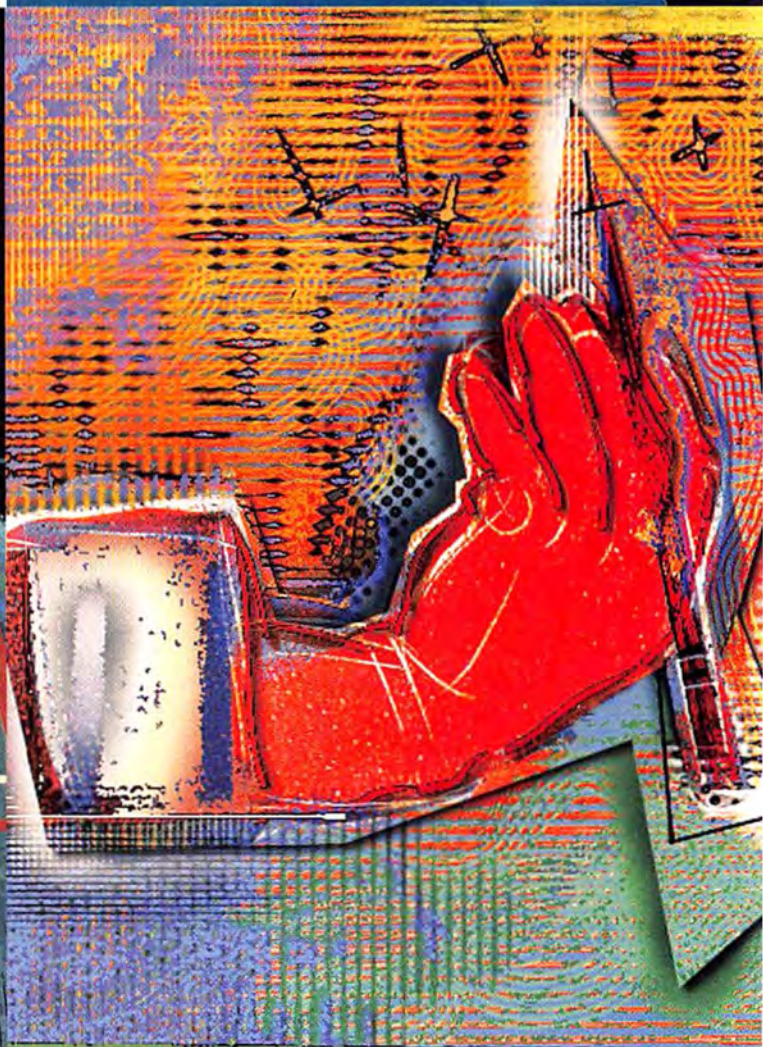
TWO NEW CONTENDERS ARE BATTLING THEIR WAY INTO THE PROFESSIONAL-DRAWING-SOFTWARE ARENA. WHEN THE DUST SETTLES, WHICH PROGRAM WILL RULE?

IN PROFESSIONAL DESIGN SHOPS, where deadlines are tight, a single drawing-tool feature can make the difference between completing a project on time or turning it in late. Perhaps that's why in many shops, veteran drawing packages Adobe Illustrator and Macromedia's FreeHand share hard-disk space — so if one program doesn't have what a designer needs, chances are good its rival does.

But not everyone can afford to have both Illustrator and FreeHand in their arsenal. What's more, the two programs now have company. CorelDRAW, a big-time player in the Windows camp, boasts a spanking-new Mac version that Corel claims can go head to head against Illustrator and FreeHand. Deneba's Canvas, a longtime favorite of technical illustrators and less demanding graphics users, has undergone a major renovation, and it too claims to be on a par with the heavyweights.

BY SHELLEY CRYAN

ILLUSTRATION / CLOCKWISE, FROM UPPER LEFT: BARBARA CAMP, JOHN UELAND, SUSAN LEVAN, MELINDA BECK



Are CorelDRAW and Canvas true contenders for the heavyweight crown? And whether or not they are, for those who can afford only one package, which is tops overall? To find out, we put all four programs to the test, checking for overall soundness and breadth and depth of features. We focused especially on features that set one program apart from its rivals — one unique and stellar tool can, after all, make a program indispensable for certain types of uses.

Many of these pivotal features are evidence of the hottest new trend in drawing programs — rasterizing capability, which lets you convert vector-based objects into pixel-based ones. This feature comes in handy if your designs are destined for the World Wide Web, where pixel-based formats reign. CorelDRAW, with no rasterizing capability, defines one end of the spectrum; FreeHand and Illustrator occupy the middle ground; and Canvas offers a full set of image-editing capabilities. In rating the four programs, we gave extra points to those with rasterizing capabilities, although we weighted core drawing and editing features most heavily. And although additional bundled software wasn't a major factor in our ratings, all four drawing-software vendors are clearly striving to offer excellent value to their customers (see the "What's in a Bundle?" sidebar).

THE BOTTOM LINE

PROFESSIONAL GRAPHICS DESIGNERS demand both breadth and depth from their drawing software. Today, with two new entries in the field, designers have more choices than ever before. Although these new entries may work well for nonprofessionals, our ratings reflect their appropriateness as industrial-strength tools for demanding professional designers. After we had scrutinized each package carefully, we found that veteran Adobe Illustrator edged out the competition.

RATING	PRODUCT
★★★★½ BEST BUY	**Adobe Illustrator 6.0** The program of choice for adventurous graphic designers, Illustrator offers a stellar Bézier environment, versatile masking features, excellent integration with other programs, and support for third-party plug-ins. A good selection of Adobe plug-ins and canned fills rounds out the package.
★★★★	**FreeHand 5.5** FreeHand's top-notch text handling, easy path simplification, and intelligent handling of imported TIFFs make it the best program for production purposes, although its rasterizing features are weak.
★★★½	**Canvas 5** With its large assortment of tools, top-notch object blends, and excellent interface, Canvas is an attractive all-in-one package, but it lacks some features professionals expect, such as pressure-sensitive-drawing support, distinct path and fill patterns, and the ability to apply gradients across multiple objects.
★★★	**CorelDRAW 6** This is a solid cross-platform program convenient for mostly Windows offices. Mac veterans will find its interface awkward, though, and its feature set is limited (it has no rasterizing capability or support for third-party plug-ins).

DRAWING AND EDITING

At first glance, the four programs appear to be more alike than different when it comes to drawing and editing features. Each has tools for creating rectangles, ellipses, and Bézier paths. You can create complex shapes by using sophisticated path-editing options that punch holes in objects, isolate the intersections of objects, and combine several objects into a single closed path. Object blends help you create a contoured look, and special-effects filters transform vector-based objects from the ordinary to the extraordinary. Last, each program offers a Bézier pen for drawing vector-based objects.

But as we delved into these features, we began to uncover the differences. When it comes to Bézier environments, Illustrator's pen tool rises above the others. Intelligent keystroke and click combinations make it easy to switch between drawing and editing and changing anchor-point types. In addition, Illustrator's environment felt snappier and more responsive than the others.

Another of Illustrator's strengths is the program's terrific masking and rasterizing features. A robust bundle of included bitmap filters for enhancing rasterized images rounds out a stellar performer. Although both Illustrator and FreeHand accept vector- and bitmap-based third-party plug-ins and Canvas accepts bitmap-based ones, Illustrator offers the widest range of compatibility.

Illustrator loses points, however, for its woefully anemic object blends and its lack of object styles. And it still can colorize only 1-bit bitmaps — its three rivals can handle grayscale images too.

If you've ever gone cross-eyed trying to fine-tune a path riddled with anchor points, you'll appreciate one of FreeHand's signature features (which CorelDRAW now includes as well) — the simplify-paths command. In an instant, the command intelligently eliminates needless points, making it easier to edit objects. An added plus is the boost in print speed you get. Another FreeHand strength is its bezigon tool, which comes in handy for quickly roughing out shapes you can fine-tune later.

Compared to Illustrator's rasterizing capabilities, those of both FreeHand and Canvas come up short. CorelDRAW isn't even in the game. Unlike Illustrator, neither FreeHand nor Canvas has an automatic-mask option, which preserves the shape of converted objects. With FreeHand and Canvas, you're left with a bothersome rectangular white border around converted objects.

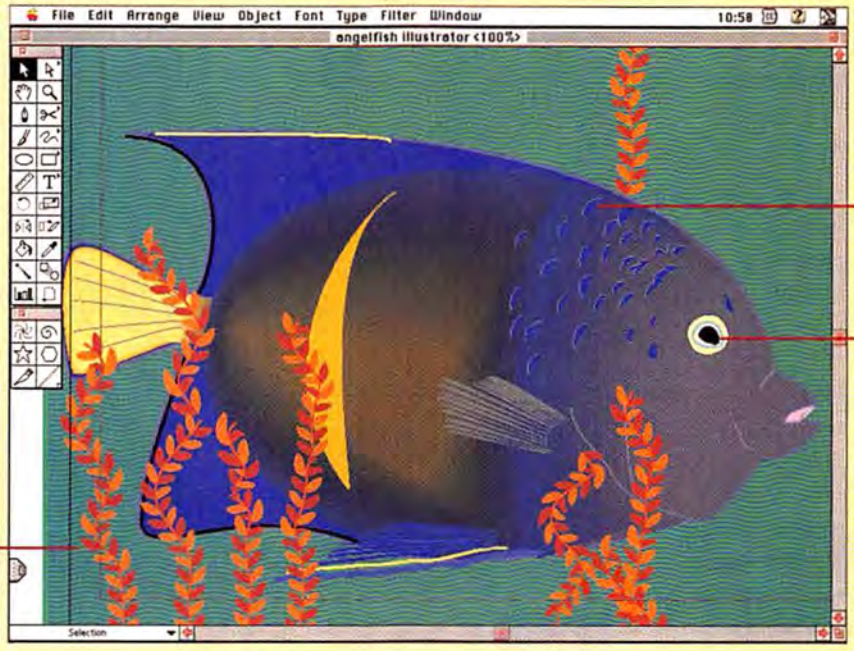
Canvas is king of the hill when it comes to object blends. It doesn't limit you to blending only two objects at a time, as the other programs do, and you can edit start, end, *and* intermediate objects dynamically, so if you recolor any object or adjust an anchor point anywhere in a blend, Canvas will automatically recalculate it.

Canvas also offers the widest selection of primitives, and its unique macro objects, which work like an internal publish-and-subscribe, are a boon to technical illustrators, as are its dimensioning and area-calculation tools.

Unlike FreeHand and Illustrator, however, neither

GONE FISHIN' / *trolling for strengths and weaknesses*

ONCE WE HAD PLUMBED the depths of each of the four high-end drawing programs, we discovered significant differences in their feature sets and interfaces. Illustrated here are some of the highlights from each program.



You save a step when you create shapes such as these scales, because Illustrator lets you fill open paths.

After using two perfect circles to create the eye, we used Illustrator's Roughen filter to make it look more natural.

Illustrator's Path Pattern filter helped us create these seaweed strands quickly and easily.

ADOBE ILLUSTRATOR 6.0

Canvas nor CorelDRAW supports pressure-sensitive drawing of vector-based objects, and with Canvas you can't customize the freehand-drawing tool's tolerances. These programs also lack the versatile knife tool, available in the two veteran programs. Both CorelDRAW and Canvas can cut closed paths with straight lines only, so if you want to divide an object along an irregular edge, you have to resort to a multistep process.

Aside from its simplify-paths command, CorelDRAW offers no standout features for drawing and editing. Its drawing and editing tools are pretty solid, but they lack luster. Its envelope effects aren't as intuitive as those of Canvas, and its object blends, although full-featured, aren't as easy to implement. Several of its lens effects, such as the magnifying glass and the fish-eye lens, are fun, but they won't have professionals reaching for their wallets. And, as mentioned before, there's no support for converting vector-based objects into bitmaps.

FILLS AND STROKES

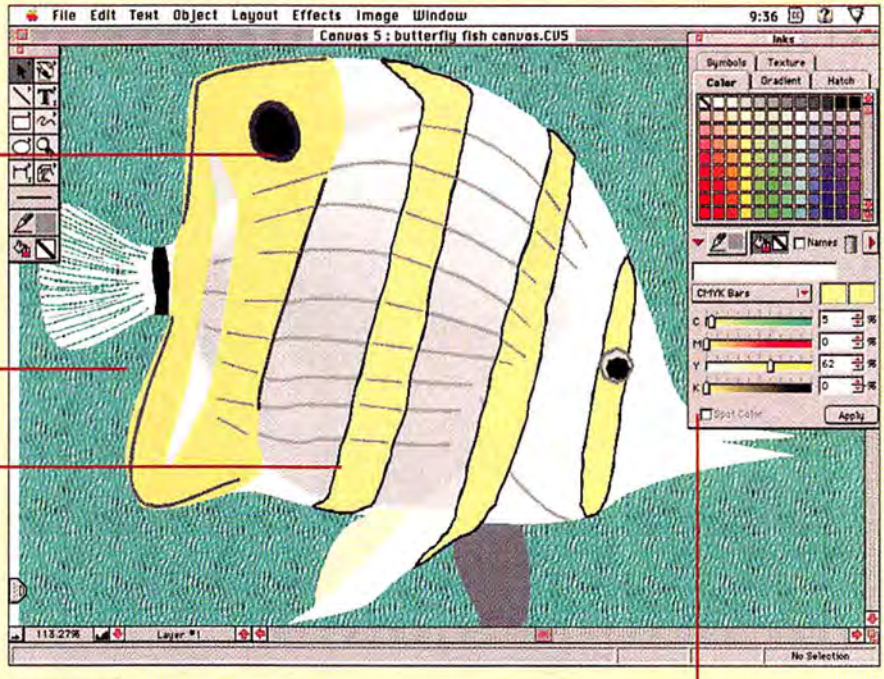
Once you've created objects, you'll want to fill them and customize their outlines. Standard fill options include solid colors, multicolor gradients, and vector- or bitmap-based fill patterns. You can also fill objects with hatch patterns that resemble ink-pen drawings, jazz up paths with solid-color strokes and patterns, make lines dashed, and add stylized arrowheads for impact. All four programs come with canned fills and strokes, many of which you can customize, and you can design your own artwork and have the program automatically repeat it, in tile fashion, as a fill.

Of all the programs, Illustrator earns the "best of category" award for its superior fill and stroke options. Its unique Path Pattern filter recognizes that patterns don't always travel along straight lines and should adapt differently to inner and outer corners. You can customize the path patterns that come with the program or create your own.

Illustrator's hatch fill patterns offer the most customizing features, and the program's eyedropper tool is the best in the business. It lets you snatch colors not only from any open Illustrator document but also from anywhere on the desktop. Illustrator's biggest drawback in this category is that it doesn't let you define colors in the RGB color space — important if you're designing graphics destined for on-screen display, such as Web designs.

FreeHand's path options are quite a few notches below those of Illustrator, but the creators of FreeHand have additionally wisely recognized that path patterns should behave differently from fill patterns. It offers 23 canned, colorable, customizable PostScript-based strokes — including wave, snowflake, and zigzag — and you can specify such things as the size of your zigs and zags. What you can't do is view these effects on-screen; to find out what they look like, you have to wait for a printout. This problem plagues many of FreeHand's fill patterns as well — the program substitutes nondescript placeholders for PostScript hatches and textures. Tiled vector-based

GONE FISHIN' / *continued*



Sophisticated path-combination effects include the ability to punch out one path with another so the background shows through.

A healthy selection of bitmap-based fills includes many textures.

Canvas' Fractalize command was applied to these Bézier paths to make them more irregular and natural-looking.

Well-designed, tabbed floating palettes let you choose preset options at the top and customize settings at the bottom. Consistency among palettes helps you learn the program quickly.

fills, however, appear correctly on-screen.

Canvas' standout feature in this category is the ability to create custom bitmap fill patterns from rasterized objects created in Canvas itself. The program also offers some handy neon and parallel-line stroke options. But you can't apply a gradient across multiple objects, and Canvas doesn't differentiate between fill and stroke patterns and textures, which affects precision.

CorelDRAW's spartan stroke features will leave professionals disappointed. The program does offer fillable PowerLines, which simulate various calligraphy-pen types and offer stylized shapes for strokes, but most designers will want more. Also, neither CorelDRAW nor FreeHand lets you fill open paths, and CorelDRAW lacks an eyedropper tool. Two pluses, though, are the fine control CorelDRAW offers over the process of creating two-color bitmap patterns and the sophisticated customizing options it provides for a plethora of included full-color bitmap texture fills.

TEXT HANDLING

Graphic design isn't just about graphics. More often than not, designers need to integrate text, be it a stylized headline on a poster or a few columns of text on a brochure, into their designs. Sometimes the text is the major design element, wrapped around an ellipse or acting as a mask in front of a brightly colored background.

All these programs let you wrap text around a path, link text boxes, and fine-tune kerning. You can convert text into a collection of graphic objects, complete with Bézier handles and anchor points you can manipulate. Hyphenation controls, spelling checkers, and tabs — usually associated with page-layout programs — are standard fare these days in high-end drawing programs.

But the four programs are not on equal ground when it comes to text-handling details. Overall, we found Illustrator's text-handling features incomplete. Aside from the program's Fit Headline feature, which adjusts the tracking value and sometimes font weight, to fit a single line of text into a text box, it offers no unique features, and several essential ones are missing. Its options for

WHAT'S IN A BUNDLE?

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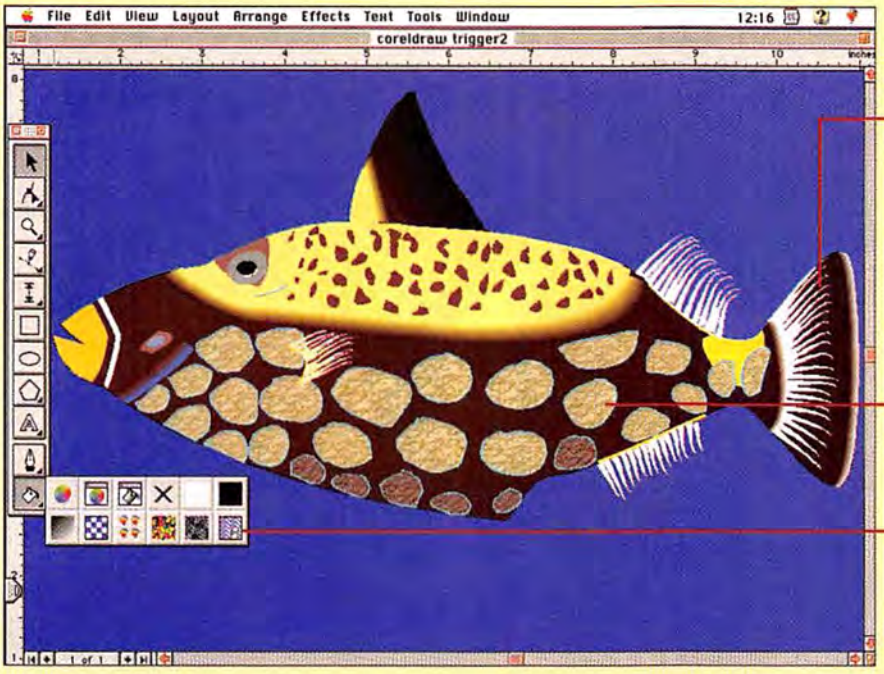
- Adobe Acrobat Reader



CorelDRAW's handy PowerLines let you draw lines that have tapered, predefined widths.

CorelDRAW provides a wide variety of customizable bitmap texture fills that add impact to your designs.

CorelDRAW's interface is a disappointment. Fill controls, for example, are scattered among 12 CorelDRAW icons, which aren't well marked.

CORELDRAW 6

binding text to a path are the worst of the group — you're limited to binding a single text string to a path, and you can't opt to have characters sit upright on a curved path, rather than tilt. Illustrator also lacks text style sheets.

FreeHand, on the other hand, excels at text handling. Along with CorelDRAW, it offers the deepest set of text-on-a-path features. It's the only drawing program that offers a wrapping tab, which comes in handy for creating tables with lengthy entries. Unique copy-fitting features automatically balance text among multiple columns, and you can alter leading and point size to make the copy fit the text box. Another unique feature allows you to paste a graphic into a text string and then treat it like a character. Combine an in-line graphic with FreeHand's great text-on-a-path features, and you have great graphics-on-a-path features.

Canvas' text-handling features may not be as rich as FreeHand's, but the program does offer one nice feature (which CorelDRAW also has): envelope effects for text, à la TypeStyler or LetraStudio. Surround selected text with a vector-based envelope, drag on the envelope's anchor points, and adjust the Bézier handles to customize the envelope, and the characters inside form-fit to the envelope. What's missing from Canvas' text-handling features

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LIST PRICE: $649

INCLUDES

- 10,000 clip-art files
- 500 fonts (Type 1 and TrueType)
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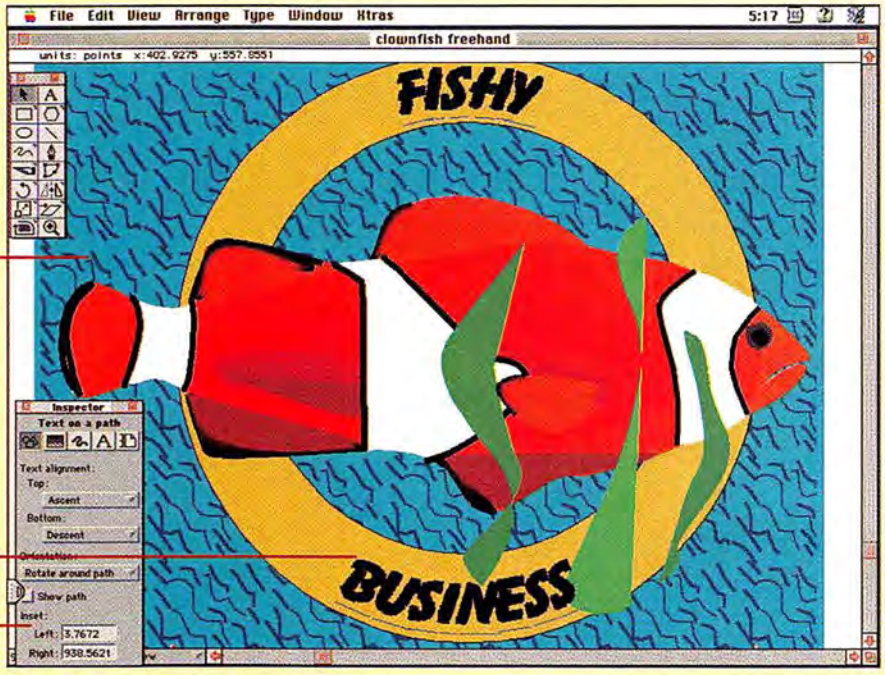
- xRes
- Fontographer
- Sample models and photos
- Kai's Power Tools 3.0 Special Edition

GONE FISHIN' / *continued*

We created our own blue squiggly lines for the background and had FreeHand use the artwork as a tile pattern.

FreeHand's text-handling features are the best of the bunch. We bound two lines of text to the circle, by using a single command. You can set the points of attachment independently for the top and bottom text.

FreeHand's Inspector palette is an interface advantage. Its contents change according to the object you've selected.



FREEHAND 5.5

is a full range of text-on-path options and the ability to create multiple rows of text.

CorelDRAW distinguishes between Artistic Text and Paragraph Text, with separate tools for creating each. This proves annoying, because not all features are available for both kinds of text, so you need to be aware of the type of text you're working with and convert it if need be. But in other respects, CorelDRAW's text handling is strong. Stellar text-on-a-path options earn it points, as does the program's text-editing dialog box, which makes it easy to edit text that's difficult to read on-screen, such as tiny text or text on a path. FreeHand also has this feature.

INS AND OUTS

No program exists in a vacuum. Inevitably, you'll want to spice up your illustrations with files you've imported from other programs, in a variety of bitmap and vector formats. And when your artwork is complete, you may want to use it in a page-layout document, a slide, or a Web page. If you simply want to print it out, you will need crop marks, trapping controls, and options for creating color separations.

Illustrator takes the prize for convenience when dealing with other applications, letting you drag and drop to and from PageMill and Photoshop. Double-click on a placed EPS file in PageMaker, and you'll launch Illustrator. The program's EPS parser lets you open and edit EPS files created in other applications. Canvas and CorelDRAW also have this feature. FreeHand does not.

If you place lots of TIFFs, you'll appreciate the way FreeHand handles them. The other programs incorporate imported TIFFs into the drawing file, but FreeHand can create a pointer to the original TIFF. This saves tremendous amounts of time and space, making it easier to transport and work with files. Furthermore, FreeHand lets you decide between high and low resolution for imported TIFFs — a lower resolution speeds screen redraws. FreeHand does not, however, let you import or export in GIF or JPEG format, although it offers Web-savvy features via the Shockwave for FreeHand plug-in.

Canvas' features in this area are solid. Unlike with Illustrator and FreeHand, its Windows version is identical to the Mac version — a plus for dual-platform shops.

CorelDRAW shares the cross-platform advantage. It also offers handy printer styles, which let you save print settings and apply them to documents.

PROGRAM INTERFACE

A well-structured drawing program offers a myriad of conveniences for setting up and managing documents. Layer management is key, as are built-in aids for precision drawing. But there's more to an interface than features. Indeed, terrific features do you little good if you can't locate them easily and access them conveniently.

If Hollywood made an Illustrator movie, it'd be called *Attack of the Killer Tools.* For starters, Adobe's program presents a daunting screen full of 27 visible tools. Another drawback is the Paint Style palette, which ought to have a

New button, to make it easier to create and name custom colors. It should also let you load sets of colors, gradients, and patterns right from the palette, instead of requiring you to schlep to the File menu.

Furthermore, Illustrator's menu organization is downright annoying. Many of the program's add-ons are dumped onto the Filter menu. Does a designer care that the ability to select objects with like stroke colors is an add-on? More important, would you look first on the Filter menu for such a tool? Hardly — you'd expect to find it on the Edit menu, near Select All. Other features stuffed erroneously onto the Filter menu include options for color manipulation, ink-pen fills, and mask customization. This placement may make sense to programmers, but it doesn't to designers.

It's baffling that Illustrator's Filter menu is so overstuffed, given that the program's new API (application-programming interface) lets third-party plug-ins reside on any Illustrator menu. Illustrator needs to make better use of this API itself.

FreeHand takes a similar route, having add-ons on its Xtras menu and palette. In effect, segregating Xtras from the rest of the program divides the program in two — if you can't find a feature in the "regular" program, you have to look in the Xtras section, doubling your search time. For example, you create two-color gradients in the main part of the program, using the Fill Inspector palette, but you need to launch an Xtra if you want a gradient with more colors. FreeHand provides a unifying control mechanism with its Inspector-palette system — it should integrate Xtras into that system.

Canvas gets top honors for the best-designed interface — it's come a long way from the convoluted interface of previous versions. Consistency among its tear-off palettes contributes greatly to how quickly you can learn the program. Their tabbed structure, as well as built-in, easy-to-use controls for creating custom options and saving those options, helps make the palettes a model of elegance.

You'd expect a brand-new program to have some rough edges, but with CorelDRAW, there's no excuse. It's had years as a Windows program to perfect its interface, but the experience hasn't helped it have a decent Mac interface. It's not that CorelDRAW for the Mac is Windows-like — although little things belie its heritage — but it's poorly organized. Its Hollywood title would be *Twister, the Aftermath.*

CorelDRAW's stroke and fill options are strewn among 24 tool-bar "flyouts." Also, features are scattered haphazardly among the menus. For example, access to the View Manager, as well as to general display options, isn't via the View menu; instead, the options are inexplicably hidden on the Tools menu. To customize a tool, you'd expect to look on the Tools menu, but CorelDRAW has *that* option on the View menu, along with access to the floating Text palette, despite the existence of a Text menu. And if you opened all the floating tool bars accessible via the View menu, you'd be staring at nearly seven dozen icons.

DRAWING THE LINE

After scrutinizing each and every feature of the Mac's four professional-level drawing programs, we were able to distinguish a definite pecking order. CorelDRAW's strongest feature is the program's ubiquitous Windows version and the seamless compatibility it offers between that and the Mac version. If you run a mostly Windows shop, you probably already use CorelDRAW and standardizing on a single program will save training time. Overall, CorelDRAW is solid, but designers who have grown used

DRAWING AND EDITING FEATURES

✓ MacUser BEST BUY	✓ ADOBE ILLUSTRATOR 6.0	CANVAS 5	CORELDRAW 6	FREEHAND 5.5
GRADE	**A**	**B**	**B**	**A**
VECTOR-BASED				
Bézier pen tool	●	●	●	●
Bezigon tool				●
Edits anchor-point type	●	●	●	●
Hides anchor points	●			
Splits paths anywhere along path	●	●	●	●
Custom tolerance settings for freehand tool	●		●	●
Pressure-sensitive-drawing support	●			●
Simplify-paths command			●	●
Spiral tool	●	●	●	●
Star tool	●	●	●	●
Framed-star/wheel/spoke tool		●		
Polygon tool	●	●	●	●
Automatic object tracing	●	●	●	●
Knife tool for slicing objects with irregularly shaped paths	●			●
Object blends that reblend when you edit start or end shapes		●	●	●
Automatic object drop shadows	●	●		
Vector-based special effects	●	●	●	●
Aligns palette that remains on-screen as adjustments are made	●	●	●	●
Moves masked items independently from mask	●	●	●	
Masks can be filled and stroked	●			
Calculates objects' intersection, union, and other combinations to form new objects	●	●	●	●
Object find	●	●	●	
Envelope effects	●	●	●	
Named individual objects		●		
Creates, saves, and imports object styles		●	●	●
Parent/child-object-style relationship		●		
Supports third-party plug-ins for manipulating vector-based objects	●			●
BITMAP-BASED				
Creates bitmap objects from vector objects	●	●		●
Option to automatically create a mask for converted objects	●			
Special effects for bitmap objects	●	●		●
Can colorize black-and-white and grayscale images		●	●	●
Supports third-party plug-ins for manipulating bitmap objects	●	●		●
Image-editing tools		●		

to Macintosh drawing programs will probably find themselves cursing the interface and missing the features available with other programs.

Canvas has come a long way since its last incarnation and can now be considered a serious contender in the professional arena. Its scope — it includes a hefty assortment of image-editing, 3-D-rendering, page-layout, and presentation tools in addition to drawing tools — makes it attractive as an all-in-one package. Its unparalleled interface will make it easy for those designers still clinging to traditional tools to make the jump to computerized design. Furthermore, Canvas' terrific object blends alone should earn the program a place on many professional designers' hard disks. But because it's lacking features that pros expect, high-powered designers shouldn't depend on Canvas as their sole drawing program.

FreeHand has superb drawing and text-handling features. With its simplify-paths command and handling of imported TIFFs, it's the best program from a production standpoint.

BOOKMARK

RELATED INTERNET SITES

Illustrator for Illustrators
Detailed descriptions of Illustrator features, plus useful tips and techniques.

Anton's FreeHand Page
Tips, tricks, and in-depth information on all things FreeHand.

GO TO **http://www.zdnet.com/macuser/mu_1196/features/draw.html**

COMPANY INFO

ADOBE SYSTEMS
Mountain View, CA
800-649-3875
415-961-4400
http://www.adobe.com/

COREL
Ottawa, ON
Canada
800-772-6735
613-728-8200
http://www.corel.com/

DENEBA SOFTWARE
Miami, FL
305-596-5644
http://www.deneba.com

MACROMEDIA
San Francisco, CA
800-457-1774
415-252-2000
http://www.macromedia.com/

But for the ultimate in design flexibility, the program of choice is Illustrator, which is tailor-made for finicky graphic designers who constantly need to stretch the envelope. Top-notch plug-in compatibility and tight integration with Photoshop, PageMill, and other programs are a bonus.

Shelley Cryan is a graphics designer and *MacUser* contributing editor.

FILL, STROKE, AND COLOR-HANDLING TOOLS

✓ MacUser BEST BUY	✓ ADOBE ILLUSTRATOR 6.0	CANVAS 5	CORELDRAW 6	FREEHAND 5.5
GRADE	**A-**	**B-**	**C**	**B-**
FILL/STROKE				
Custom tiled vector-based fills	●	●	●	●
Filled objects update when vector-based tiles are edited	●			
Hatch patterns	●	●	●	●
Custom tiled bitmap-based patterns		●	●	●
Gradients with more than two colors	●	●	●	●
Adjusts gradient direction	●	●	●	●
Custom path patterns that distinguish between side and corner patterns	●			
Applies gradients across many objects	●		●	●
Objects filled with named color, pattern, or gradient fills update when fill is edited	●			
Custom dash sequences for strokes	●	●		●
Customizable arrowheads for stroke ends	●	●	●	●
Fills open paths	●	●		
COLOR HANDLING				
Pantone	●	●	●	●
Trumatch	●	●	●	●
Toyo	●	●	●	●
Custom CMYK	●	●	●	●
Custom RGB		●	●	●
Custom HSL		●	●	●
Eyedropper tool samples colors outside application	●	●		
Imports custom color sets	●	●	●	●

TEXT-HANDLING FEATURES

✓ MacUser BEST BUY	✓ ADOBE ILLUSTRATOR 6.0	CANVAS 5	CORELDRAW 6	FREEHAND 5.5
GRADE	**B-**	**B**	**B**	**A**
Custom kerning	●	●	●	●
Type along path	●	●	●	●
Text styles with parent/child relationship		●		●
Transfers text styles to other documents		●	●	●
Horizontal scaling of text	●	●	●	●
Converts type to paths	●	●	●	●
Spelling checker	●	●	●	●
Custom tab leaders		●	●	●
Hyphenation controls	●	●	●	●
Characters mold to shape of envelope		●	●	
Linked text boxes	●	●	●	●
Letterspacing, word-spacing controls	●	●	●	●
Custom inset range for text in text boxes	●	●	●	●
Multiple columns in text box	●	●	●	●
Multiple rows in text box	●			●
Automatic copy fitting				●
In-line graphics				●
Fits headline to text box	●			
Text editor with large text-view area			●	●
Editable text can be stroked and filled with gradients		●		

ON THE DRAWING BOARD / *FreeHand 7*

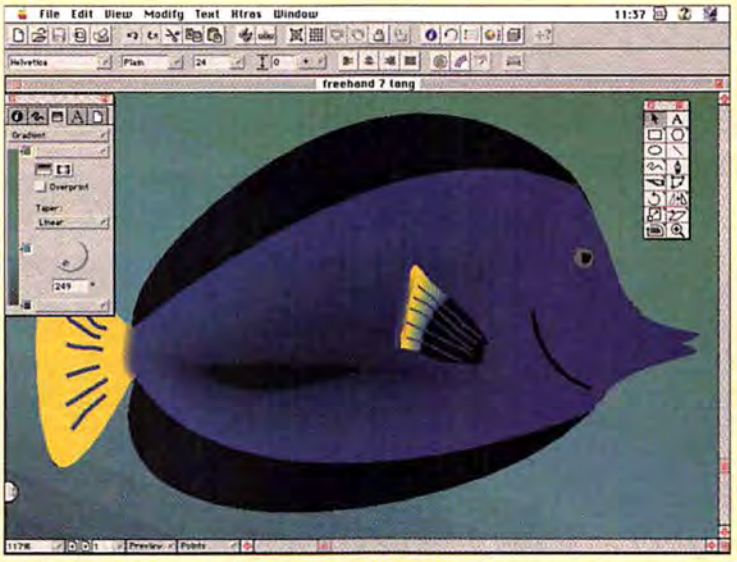
AT PRESS TIME, a new version of FreeHand was almost ready and we got a peek at a beta copy. Generally, Macromedia seems to have cherry-picked top features from the competition, and we think it's chosen wisely.

In the catch-up-with-Illustrator department, FreeHand 7 (yup, it skips a number) plans to offer Macintosh Drag and Drop capabilities with Photoshop. A smoother, more responsive Bézier pen is also in the works, in response to Illustrator's current domination in that area. And FreeHand will finally offer charting features, so you can create bar, line, pie, and area charts.

Matching Canvas and CorelDRAW, FreeHand 7 adds envelope distortions and beefs up its object blends, including support for multiobject blends and blends along a path. Print style sheets, introduced by CorelDRAW, are in FreeHand's upcoming version as well. Another catch-up feature — import/export support for GIF and JPEG files, offered in all three other programs — will please those who design for the Internet.

A new graphic search-and-replace feature in FreeHand 7 lets you modify the fills, colors, stroke types, rotations, and blend steps for large groups of objects. Plans include the option to paste any object into this tool and replace all instances of it with a different specified object.

FreeHand 7 innovations include full-color autotrace, which will let you transform any bitmap image into full-color, completely editable vector-based art. Interface tweaks and performance boosts contribute to the upgrade, and dual-platform shops will appreciate a simultaneous upgrade for Windows, putting the Mac and Windows versions in feature parity.



FreeHand 7 boasts numerous improvements, including redesigned tabbed palettes and new tool bars.

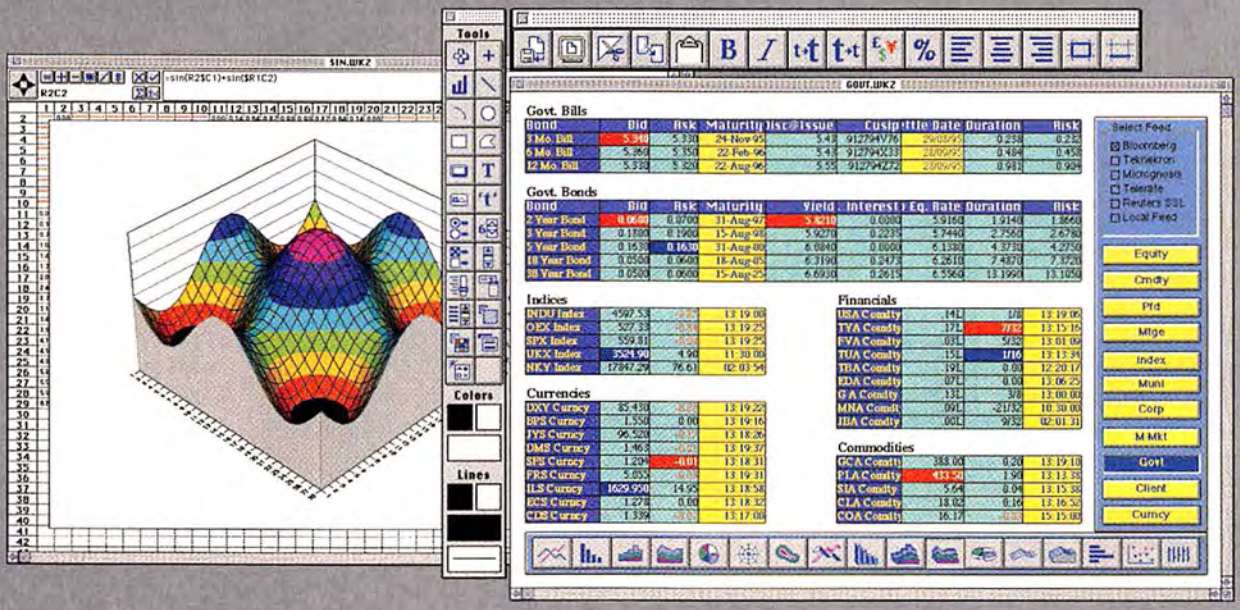
INS AND OUTS

✓ MacUser BEST BUY	✓ ADOBE ILLUSTRATOR 6.0	CANVAS 5	CORELDRAW 6	FREEHAND 5.5
GRADE	**A**	**B**	**B**	**B**
PRINTING				
Prints selected objects	●	●	●	
Trapping	●	●	●	●
Specifies color plates to print	●	●	●	●
Previews color separations	●	●	●	
Out-of-gamut warning		●	●	
Registration, crop, and trim marks	●	●	●	●
Prints selected layers	●	●		●
Saves and applies custom print styles			●	
IMPORT/EXPORT				
EPS	●/●	●/●	●/●	●/●
Photoshop	●/●	●/●	●/●	●/●
GIF	●/●	●/●	●/●	/
PDF	●/●	●/●	●/●	●/●
TIFF	●/●	●/●	●/●	●/●
JPEG	●/●	●/●	●/●	/
BMP	●/●	●/●	●/●	/
PCX	●/●	●/●	●/●	/
SPECIAL				
Claris XTND translators	●	●		
Photoshop-compatible Acquire and Export modules	●	●		●
TWAIN Acquisition modules		●		
Built-in PostScript interpreter allows opening and editing of EPS files	●	●	●	

INTERFACE FEATURES

✓ MacUser BEST BUY	✓ ADOBE ILLUSTRATOR 6.0	CANVAS 5	CORELDRAW 6	FREEHAND 5.5
GRADE	**B–**	**A**	**C–**	**B**
Names, arranges, locks, and hides layers	●	●	●	●
Dynamic object libraries		●		
Snap-to-grid options with user-definable grid spacing		●	●	●
Locks/unlocks by object		●		●
Custom units of measurement	●	●	●	●
Interruptible screen redraw	●	●	●	●
Saves views with custom magnification, location	●	●	●	
Straight/slanted guidelines	●/●	●/	●/●	●/
Saves settings, customizations in template	●	●	●	●
Multiple pages		●	●	●
Single document can accommodate multiple page sizes				●
Palette-management commands to automatically roll up, put away, or arrange palettes		●		
Tiles and cascades windows		●	●	
Greek type below user-specified size	●		●	●
Deletes unpainted objects, stray points, and empty text boxes	●			
Runs on 680x0 Macs	●	●		●
Built-in online help	●	●	●	●

The second generation of the largest, fastest Mac spreadsheet has arrived.



Introducing Wingz 2.1

This new release of Wingz provides major enhancements in the area of performance, flexibility and ease of use. The architecture of the worksheet has been further extended to allow the most demanding data sets, and the user interface has been redesigned making it easier than ever to tap into the vast analytical power of the Wingz environment.

Some Wingz 2.1 features:

- Dynamic Arrays
- Improved Recalculation
- ODBC Support
- Enhanced Reporting
- Floating Toolbox
- Intelligent Color Indicators
- Chart Defaults
- Bound-in Externals
- Point & Click Linking
- Direct Chart Manipulation
- Links to Unopened Worksheets
- Real-time Formula Builder
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- 3d Light Sources
- Menu Confidence Levels

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As the reigning speed demon of Macintosh spreadsheets, Wingz has always maximized the potential of your graphical workstation. This latest release of Wingz has added new features and boosted performance without adding unnecessary bulk. This means that choosing Wingz as your spreadsheet is decision without compromise.

The Scaleable Spreadsheet Solution

With its powerful HyperScript language, Wingz provides unmatched versatility for creation of custom applications. An upgrade to HyperScript Tools is available for more advanced development needs. Flexible screen painters and a feature-rich graphical debugger give HST the vital components for serious programming. A runtime module also is included for deployment of standalone applications. Multiplatform support allows Wingz and HST programs to run unmodified in Macintosh, Windows and UNIX environments.

For live data capture and manipulation, Real-time versions also are available.

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For a limited time, existing Wingz users can upgrade to version 2.1 for the remarkably low price of $89. Hyperscript Tools upgrades are available for only $179. If you use another spreadsheet, please ask us about our competitive upgrade plan. You must act quickly, however, as this opportunity will not last.

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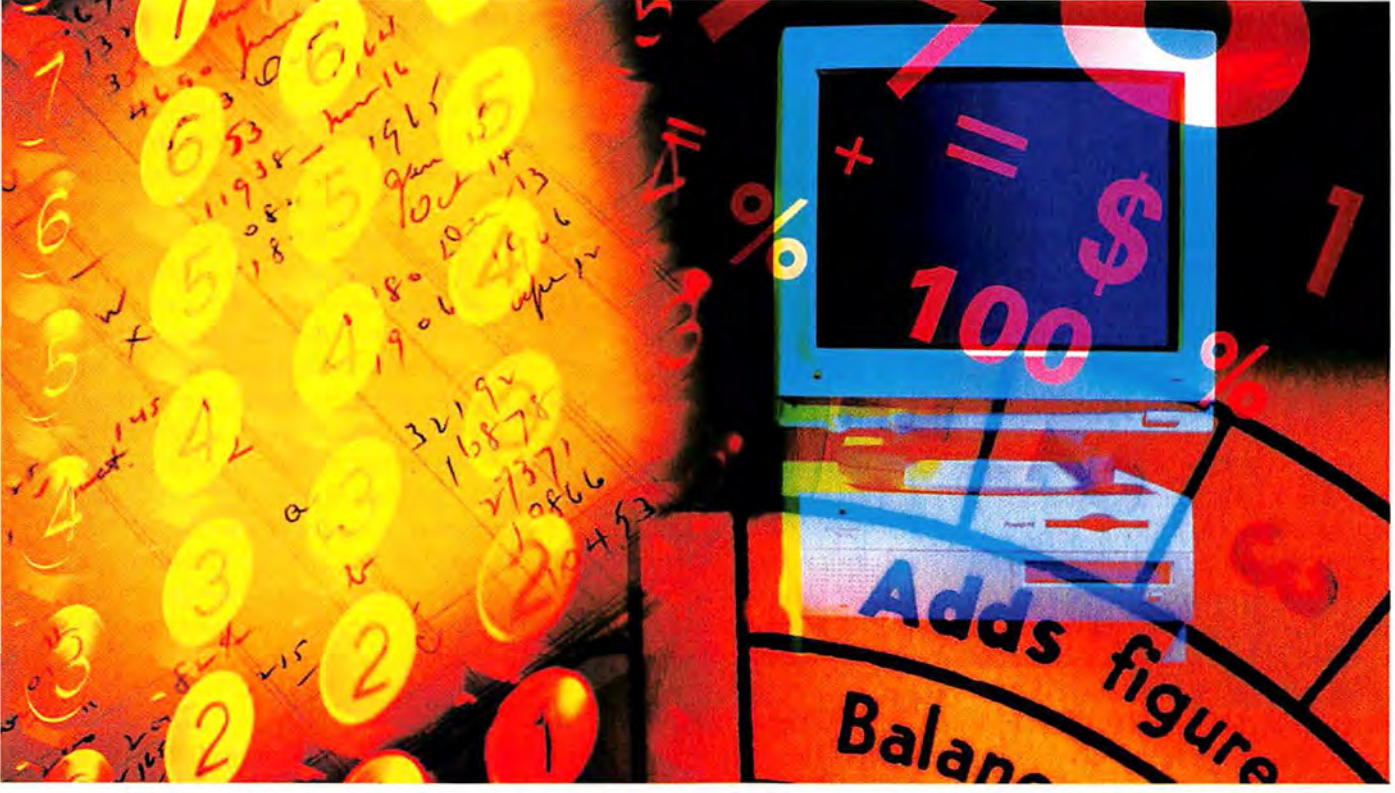


ACCOUNTING *for Yourself*

These five small-business accounting packages promise accounting power and "do it yourself" ease of use – how well do they fill the bill?

PHOTOGRAPHY / LON CLARK

BY KRISTI WACHTER

WHEN YOU DREAMED OF RUNNING YOUR OWN BUSINESS, you probably didn't picture yourself tracking inventory and accounts receivable. But now that your business is up and running, such chores take up more of your time than you ever imagined, and they're too complex for your spreadsheet, database, or personal-finance program. Fortunately, there is software out there that's better suited to your task — and you don't need to be an accountant to use it.

Small-business accounting is a thriving software category, so you can take your pick of reasonably priced programs promising robust features as well as ease of use. We looked at five popular programs: Big Software's Big Business, a massive program with some unique features targeted at "growing businesses"; CheckMark Software's MultiLedger, a svelte and very complete package with a somewhat intimidating interface; Best!Ware's M.Y.O.B., the product that pioneered the concept of user-friendly accounting software; Peachtree Software's Peachtree Accounting for Macintosh, a capable veteran striving to improve its ease of use; and Intuit's QuickBooks Pro, Quicken's more powerful sibling. We examined them in four key areas — startup costs, day-to-day tasks, data crunching, and ease of use — and emerged with a couple of overall winners.

STARTUP COSTS

Before you purchase any of these programs, you should consider the time and resource costs of fitting the program on your system, registering it, setting up your accounts, and importing data.

Megabyte Munching. If disk space and RAM are a concern, you won't want to think Big. Big Business lives up to its name right from the start by requiring over 40 MB of hard-disk space and a *minimum* of 7.4 MB of RAM (in addition to what the system software already requires); it will take over 13 MB of RAM if the RAM is available. By comparison, M.Y.O.B., Peachtree, and QuickBooks Pro require between 10 and 22 MB of disk space each and will run with 3 to 5 MB of RAM (although their online help applications are separate and require extra RAM); the nimble MultiLedger takes up a mere 1.2 MB on-disk and needs only 1.3 MB of RAM.

Registration Frustration. Here again, MultiLedger endears itself. All the other packages have the highly annoying requirement that you contact the company to register the software, although all but Big Business allow a limited number of uses before you register. Big Business offers a demo version that allows 30 unregistered uses.

Starting Your Charting. When it's time to set up your company's *chart of accounts* (a list of accounting categories for income sources, expenses, assets, and liabilities), you'll start to see the value of some of the disk space most of these programs take up, since it's there that the programs include stored sample charts to save you setup time. M.Y.O.B. offers charts for 100 sample companies, some of which are very specific — video-rental stores and entertainers are among the choices. Big Business comes in second, with 90 samples, whereas Peachtree and QuickBooks Pro offer 64 and 26, respectively. At the other extreme, MultiLedger's offering is inadequate — totaling only three choices. All five packages let you edit the chart of accounts at any time and let you create your own chart of accounts from scratch.

Matters of Import. If you've been using another system, such as a personal-finance package or a FileMaker Pro database, you'll probably want to import such data as accounts, customers, vendors, and inventory items. M.Y.O.B. offers the most flexibility in this area. In addition to importing tab-delimited text files (which all the programs but QuickBooks Pro can import), it imports files in Intuit's QIF format (which Quicken exports) and Timeslips' TAL format. Big Business and QuickBooks Pro can import data directly from Quicken files, but QuickBooks Pro otherwise requires a unique and complex format called IIF (described in the program's online help).

DAY-TO-DAY TASKS

Because all five programs offer standard accounting and banking functions (invoicing, purchasing, check-writing, recording of customer payments, management of bank accounts and credit cards), you'll need to focus on a few key areas when differentiating among their daily-use capabilities: flexibility of accounting periods, integration of payroll capabilities, ease of inventory tracking, and extensiveness of security features.

Accounting-Period Flexibility. A major difference in small-business accounting packages is whether they require you to close accounting periods. Those that do won't let you edit transactions from closed periods (for example, if you discover that you entered a check amount incorrectly a few months back) but will instead direct you to create a new transaction reflecting an adjustment. Accountants tend to prefer such software, since it provides a clear audit trail showing all changes. However, being able to directly edit old transactions is much easier — and less confusing — for users.

MultiLedger and Peachtree are the least flexible in this regard. MultiLedger requires you to close each month, although you can have up to two months open at a time. And although Peachtree lets you change the default accounting period so that you can access other periods for editing or printing reports, you must perform several tasks (including printing payroll checks and invoices) first.

Striking a nice balance between ease of use and accountability, M.Y.O.B., QuickBooks Pro, and Big Business all let you lock and unlock each month's data through a preferences option. This method prevents users from casually going back and changing old transactions but still keeps the option available when needed.

QuickBooks Pro also offers an audit-trail feature, implemented as a preferences setting that can be turned on and off. Users can unlock closed periods and edit old transactions at any time, but all changes are recorded in the audit trail. It's the best of both worlds: maximum flexibility and full accountability.

Payroll Particulars. Payroll, an important and daunting aspect of running a small business, is one feature that significantly differentiates the five packages, with M.Y.O.B. and QuickBooks Pro proving to be the most capable. Surprisingly for a multiuser product with employee-oriented extras such as commission tracking and intra-office e-mail,

THE BOTTOM LINE

FOR NONACCOUNTANTS, ease of use is as critical as the feature lists in these programs; we gave both strong consideration.

RATING	PRODUCT
SINGLE-USER PRODUCTS	
★★★★½ BEST BUY	**M.Y.O.B. 6.0.1** The top choice for users who don't need multiuser capabilities, M.Y.O.B. offers a friendly interface, a comprehensive feature set, and lots of flexibility. With sample account setups and reports numbering 100 or so each, lots of built-in reminders, plenty of security levels, and standout inventory and payroll capabilities, M.Y.O.B. is a joy to use.
★★★★	**QuickBooks Pro 3.1** A close second to M.Y.O.B. for single-user setups, QuickBooks Pro offers the exemplary ease of use you'd expect from a Quicken sibling, plus many nice touches such as audit trails, timesheets, and impressive graphing.
MULTIUSER PRODUCTS	
★★★½ BEST BUY	**Big Business 2.0.1** Offering many unique features and sample setups, Big Business is our first choice among the multiuser programs. Though it's large in size and lacks job-tracking and built-in-payroll capabilities, Big Business has the other multiuser programs beat in ease of use, security, and reporting capabilities.
★★★	**MultiLedger 4.0** Although it packs a lot of features (including profit centers, but not payroll) into a modestly sized multiuser program, MultiLedger's unfriendly interface was a major detraction for us.
★★★	**Peachtree Accounting for Macintosh 2.5** If you need a full-featured and inexpensive multiuser program with payroll, Peachtree is it. However, we found its interface notably awkward.

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

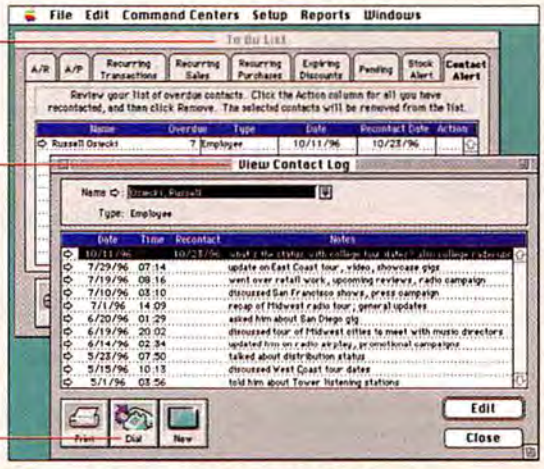
Friendly and Feature-Rich / HIGHLIGHTS OF THE SINGLE-USER PROGRAMS

PICKING THE BEST single-user package was tough, since M.Y.O.B. and QuickBooks Pro both offer well-thought-out feature sets and commendable ease of use. Shown here are some of the nice extra touches that distinguish each program.

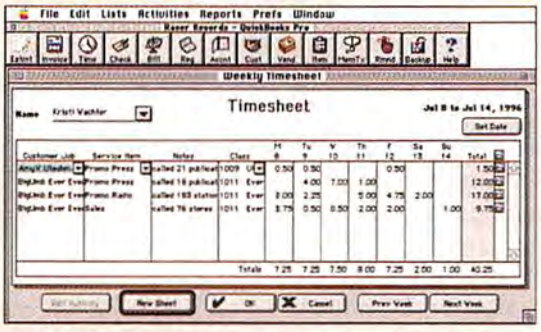
The To Do List keeps you up-to-date on tasks you need to take care of, such as bills that need paying, overdue accounts, depleted inventory, and interactions you've planned with people on your contacts list.

The Contact Log provides a handy place to record interactions with employees and customers and to plan *recontacts* — future interactions about which M.Y.O.B. will remind you in its To Do List.

Like many stand-alone contact managers, M.Y.O.B. provides a handy button you can click on to have a person's phone number dialed automatically.



M.Y.O.B.'S CONTACT MANAGER AND TO DO LIST are well integrated with each other and with the rest of the package. You get timely reminders of planned phone calls and meetings and of pressing financial and inventory issues.



QUICKBOOKS PRO'S CONVENIENT TIMESHEETS ease the task of tracking employee hours on projects and invoicing labor costs.

Big Business does not include built-in payroll. Big Software says that about 90 percent of its customers prefer to use their bank's payroll services, even though doing so costs money and gives you less last-minute control; alternatively, you can import payroll data into Big Business from Aatrix's Ultimate Payroll and CheckMark Payroll. MultiLedger imports from the latter program as well, since it also lacks built-in payroll.

M.Y.O.B. and QuickBooks Pro do an excellent job of integrating payroll into the overall package. QuickBooks Pro has convenient timesheets you can fill in for each employee, making it easy to track hours spent on specific jobs and automatically include those labor costs when invoicing clients. Unfortunately, since QuickBooks Pro is not multiuser, it's difficult for individual employees to use the program to enter their own time data.

Peachtree's payroll capability lacks some of the features found in the other two products. For example, M.Y.O.B. and QuickBooks Pro make it easy to set up accrued time benefits such as sick days and vacation hours. Peachtree's manual indicates that such setup is possible, but the program doesn't make the process easy.

Inventory Ins and Outs. All five packages have adequate inventory modules, but Big Business and M.Y.O.B. stand out for extra niceties. M.Y.O.B. and Peachtree let you set up *builds* — inventory items that consist of several components. Big Business goes them one better by allowing *bundles* as well — sets of products grouped together for convenience or special sales promotions. M.Y.O.B. also alerts you when you sell more items than you have on hand, creating a backorder invoice and adding a reminder to order the sold-out item (QuickBooks Pro reminds you to order stock but fails to set up a backorder), and Big Business lets you assign royalty percentages to inventory items (unfortunately, you can't link them to a particular payee).

Security Standouts. Good security is essential in an accounting package, since you don't want unauthorized users seeing sensitive information on overdue accounts and employee salaries; here, Big Business and M.Y.O.B stand out. In Big Business, you can grant or deny particular users access to each capability, such as invoicing and reports. In M.Y.O.B., you can grant or deny access to particular windows. QuickBooks Pro's more limited security feature lets you set passwords in four areas: payroll, data entry, data editing, and global access. Peachtree Accounting's passwords control access at a more general level: You can grant access to inventory or general ledger functions, for example, but you can't get more detailed than that. The least-flexible security system belongs to MultiLedger, which offers only two options: Master and Restricted. Restricted users can edit transactions but can't run reports.

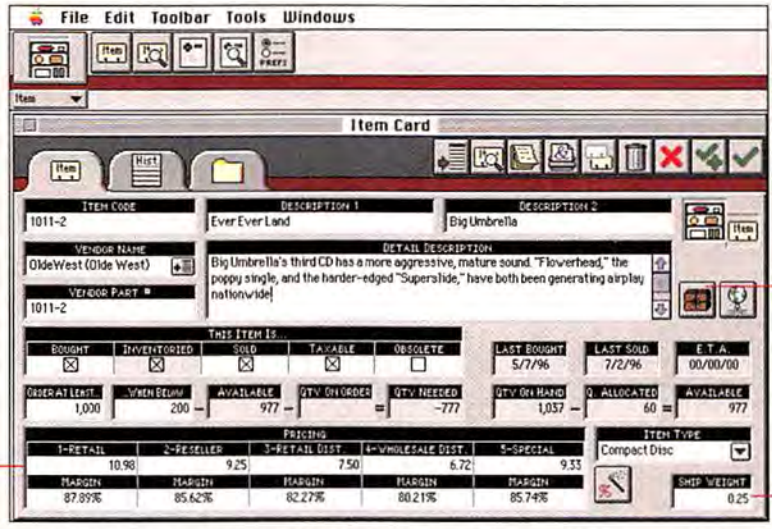
DATA CRUNCHING

In the long run, the real usefulness of an accounting program comes when it's time to analyze all the data you've carefully entered. At a minimum, accounting software should be able to produce profit-and-loss statements, balance sheets, and basic output forms such as invoices and checks. All five packages perform all of these tasks, but beyond that, there's a great divergence in their capabilities — particularly in the area of job tracking.

Rote Reports. In basic reporting capabilities, M.Y.O.B. leads the pack. It offers the greatest selection of preset reports to choose from (over 110), with extensive customization possible. It also lets you create your own reports from scratch; you can select the information you want to include from a handy set of lists. In addition, M.Y.O.B. lets you zoom in on details in reports viewed on-screen (although not down to the transaction level, as QuickBooks Pro lets you do). And although all five packages allow some data export and customization of printouts, M.Y.O.B. and Peachtree Accounting let you create report batches, so if you print the same set of reports every month (or every week), you can run them all in a single step. Peachtree does not let you save reports as text files, though, as all the other programs do — a useful feature for exporting to spreadsheets (for further analysis) or page-

A Varied Group / MULTIUSER PROGRAMS PROVIDE DIVERSE OFFERINGS

IN SEARCHING OUT the unique features (such as those shown here) of each program, we found that two of the multiuser programs offered few features that other programs didn't have; but the other — Big Business — offered far too many to show here.



Multilevel pricing — you can store up to five prices for a single product — helps you bill and track retail sales versus wholesale and other special types of sales.

Click on this button to generate HTML code for this inventory item when you're creating your online catalog for the Web.

Big Business uses the ship weight you enter for each inventory item to automatically calculate shipping charges on invoices.

BIG BUSINESS' FEATURE-RICH INVENTORY CAPABILITY shows off several of the program's nice extra touches, including multilevel pricing and a Web-page creation aid. Some of the program's unique benefits *not* shown here are built-in notes and e-mail, permanent quotes (estimates), and the ability to place customers on credit hold.

layout programs (for creating annual reports).

Questions and Forecasts. For more-complex analysis, Big Business, M.Y.O.B., and QuickBooks Pro each have particular strengths. Big Business provides Q&A reports, a list of plain-English questions (such as "Which customers haven't ordered in x days?") that bring up on-screen reports in which you can click on a line to go directly to a customer, vendor, or transaction. You can't create your own questions, but Big Software has done a good job of anticipating what you're likely to ask. Although all five programs let you compare current data with past data and projected budgets, M.Y.O.B. and QuickBooks Pro also provide cash-flow forecast reports; M.Y.O.B. even boasts a cash-flow worksheet that uses real data to forecast your cash needs but lets you make adjustments for what you think will really happen. MultiLedger can project accounts receivable and accounts payable but doesn't combine them into a single cash-flow projection. Peachtree Accounting has a Cash Manager feature for forecasting, but it's poorly implemented: You have to run it first and *then* set its parameters. Big Business doesn't have any reports or tools that analyze cash flow using anticipated payments as well as income. However, it does have a Schedule Payment tool that lets you evaluate your upcoming cash needs and decide which bills to pay first.

BOOKMARK

RELATED INTERNET SITES

Apple's Small Business Site
A helpful guide to Mac-related resources for small-business professionals.

GO TO **http://www.zdnet.com/macuser/mu_1196/features/accounting.html**

Graphs. All the packages provide some graphing, but QuickBooks Pro's graphing feature is the most impressive, allowing you to customize graphs and double-click on them to get more-detailed information. M.Y.O.B.'s graphs also allow some customization and let you change the level of detail.

Job Tracking. Job tracking lets you analyze income and expenses for each product and project — for example, a record company could track which albums are the most profitable. With the surprising exception of Big Business, all the programs offer job tracking. Peachtree Accounting and MultiLedger let you link invoices and purchases to a specific job; QuickBooks Pro and M.Y.O.B. also let you assign wages to a particular job. QuickBooks Pro's timesheet interface does a very nice job of integrating these different functions.

EASE OF USE

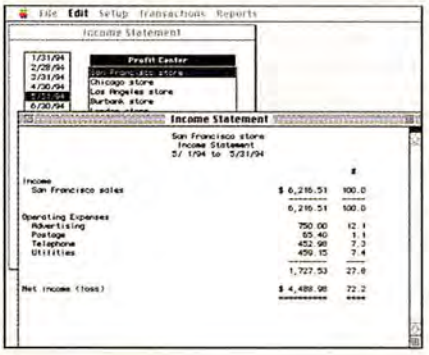
Learning accounting jargon and concepts while mastering the features of a new program can be an enormous task for the overworked staff of a small business. For this reason, we paid close attention to ease-of-use aspects such as well-designed documentation, an intuitive interface, and helpful tech support — areas in which QuickBooks Pro and M.Y.O.B. take the lead.

Documentation. This is where QuickBooks Pro really shines. The manuals are thorough and clear, and Intuit's careful attention to formatting pays huge dividends in making them easy to use. The index stands head and shoulders above those in the other packages.

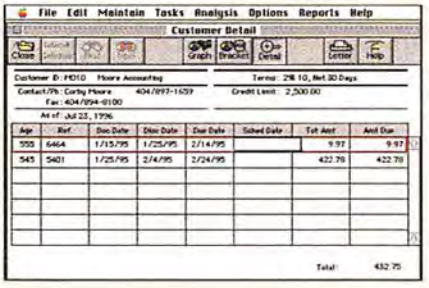
M.Y.O.B.'s documentation is good, as is Big Business' (although the latter consists of a manual for version 1.0, with a supplement for 2.0 features, and the index could be improved). MultiLedger and Peachtree Accounting both suffer from an excess of accounting jargon — for example, calling money you have received *receipts*, so that, in MultiLedger, you post to a *receipts journal* rather than just depositing money — and the index in the Peachtree Accounting manual has a lot of omissions and some errors.

QuickBooks Pro's online help is as polished as its manuals — well written and very complete. M.Y.O.B. offers very good online help, including a separate step-by-step Cue Cards help file and video tutorials for users with a CD-ROM drive. Peachtree Accounting's online help is somewhat useful, although it's difficult to navigate and is sparing with the information it provides. Big Business' online help is decent, although it consists of long, unformatted blocks of text and there's no way to search the help contents. MultiLedger provides no online help.

Interface. The friendliness of the interface varies dramatically from



MULTILEDGER'S PROFIT CENTERS let you track income and expenses for each department or store in your company — a nice extra feature in a capable program handicapped by its DOS-like interface.



PEACHTREE ACCOUNTING'S COLLECTIONS MANAGER provides a letter icon you can click on to automatically print collection letters to selected customers.

package to package. Peachtree Accounting and MultiLedger both suffer from clunky, dull interfaces; Peachtree's has some confusing screen layouts and button actions, and MultiLedger's interface is DOS-like in appearance and suffers from un-Mac-like behavior — for example, pressing Shift-Tab doesn't return you to the previous field.

Big Business has an attractive interface, featuring tab markers that allow easy access to information, but its slowness (it's built in 4D) quickly becomes irritating. On our PowerBook 5300, many a screen took as long as seven seconds to appear.

QuickBooks Pro and M.Y.O.B. have friendly, useful interfaces, although M.Y.O.B.'s has a few features that give it an advantage. M.Y.O.B. sports an extremely useful To Do List, which keeps track of every time-sensitive thing you need to take care of, such as printing payroll checks, dealing with recurring transactions, and contacting customers. Tasks that need attention are automatically added when necessary; for example, if you place an order that depletes the stock of an inventory item, the To Do List will show that you need to reorder that item. Also, M.Y.O.B. is the only package we reviewed that does not automatically save all transactions — a boon for those of us who like to play "what if" without saving, but a hazard to those who don't remember to save. QuickBooks Pro's interface is also quite nice, with a Reminders list that operates much like M.Y.O.B.'s To Do List; the menus and windows will be comfortably familiar to Quicken users.

M.Y.O.B.'s and QuickBooks Pro's implementations of the recurring-transactions feature (automating repetitious tasks such as invoicing regular customers and paying monthly bills) serve as particularly good examples of the interface superiority of these programs. In M.Y.O.B., you save such transactions with the simple click of a button; after you indicate how often it should occur, the transaction appears in the To Do List. In QuickBooks Pro, you just choose Memorize Transaction from the Edit menu; reminders then appear in the Reminders list. Big Business also has memorized transactions, but you can't specify how often they should recur and there's no to-do or reminder list to jog your memory. And the automatically recorded recurring transactions in Peachtree Accounting and MultiLedger don't give you the flexibility to change check amounts or other details that vary each time the transaction occurs.

Multiuser capabilities are important to some businesses, such as those in which several people need access to credit histories and inventories. Unfortunately, the two friendliest programs, M.Y.O.B. and QuickBooks Pro, are single-user programs. MultiLedger and Peachtree Accounting are both multiuser, and Big Business can be run as a client/server multiuser application — although at a significantly increased price.

Tech Support. QuickBooks Pro offers the best support of the lot, beating all the others hands down by offering unlimited free tech support (callers pay long-distance charges) along with an excellent Internet site and some support on CompuServe and America Online. All the programs except MultiLedger offer free fax-on-demand service. Except for Intuit's generous unlimited policy, all vendors charge for tech support but offer a brief free period: M.Y.O.B. is downright stingy, with a mere 15 minutes of free time in the first 30 days — however, the company's support staff on CompuServe is speedy and thorough. All five companies have Web sites, and Big Business, MultiLedger, and M.Y.O.B. demos are available on the Web.

Bright Forecasts / NEW VERSIONS TO BRING WELCOME IMPROVEMENTS

ILLUSTRATION / DAVE EMBER

THE FUTURE'S SO BRIGHT, you'll want to wear shades — green eyeshades, that is. That's our prediction for imminent new versions of three of these small-business accounting programs.

First, a major upgrade of MultiLedger (expected to ship by the time you read this) promises greater flexibility and a friendlier, less DOS-like interface. In version 5.0, you will no longer be required to close each month; instead, you'll have the option of locking and unlocking each month's data. Version 5.0 will also allow up to three price levels for inventory items and multiple shipping addresses for customers. It will provide additional reports; better handling of recurring entries; enhanced security features; and — last, but not least — an improved, graphical interface allowing multiple open windows.

Meanwhile, the folks who make M.Y.O.B. are continuing to improve the program. A new version, also expected to be shipping by the time you read this, promises enhanced job tracking, improved forms customization, and an interactive tutorial. More exciting, though, is the news that the company plans to ship a multiuser version by year's end.

The Big Business people have been busy too: They're hard at work on a Windows version (the Windows '95 version should come out by year's end, with a Windows NT version to follow), but the big news is the company's upcoming World Wide Web add-on. It will effectively turn your Big Business database into a Web server (no additional software needed), letting your other employees access data without requiring individual copies — and letting prospective customers browse your catalog over the Internet.

Need help keeping track of the constant changes in this software category? The Apple Business Consortium's Solutions Hotline (800-681-4636) offers up-to-date information on software as well as consultants in your area.

THE BALANCE SHEET

Although all the products have something to recommend them, M.Y.O.B. edged out its competitors by virtue of its flexibility, comprehensive feature set, and tremendous ease of use. QuickBooks Pro runs a close second; if you're already familiar with Quicken, QuickBooks Pro's similar interface could save you time and effort. However, neither of these programs offers multiuser capabilities.

Among multiuser programs, our top pick was Big Business. Although pricier than MultiLedger and Peachtree, it offers an attractive interface and special features that can prove invaluable to small businesses. However, if you need a less expensive multiuser program, you should consider Peachtree Accounting (which also offers built-in payroll) or MultiLedger (if you use profit centers). And if none of these programs sounds ideal in its current version, don't worry — with a multiuser version of M.Y.O.B. and major upgrades of MultiLedger and Big Business on their way (see the "Bright Forecasts" sidebar), you'll soon have a rich assortment from which to choose.

Kristi Wachter runs an independent record label and was amazed to discover how much she likes poring over financial statements.

Features of SMALL-BUSINESS ACCOUNTING PACKAGES

✓ MacUser BEST BUY	✓ BIG BUSINESS 2.0.1	MULTILEDGER 4.0	✓ M.Y.O.B. 6.0.1	PEACHTREE ACCOUNTING FOR MACINTOSH 2.5	QUICKBOOKS PRO 3.1
Estimated street price	$200 (3 users, $1,000)*	$160	$140	$100	$200
SETUP CONSIDERATIONS					
System required	68040 or Power Mac	any Macintosh	68020 or better	68020 or better	68020 or better
Disk space used/min. RAM	43.3 MB/7.4 MB	1.2 MB/1.3 MB	11.9 MB/3 MB	21.3 MB/2.5 MB	9.7 MB/3 MB
Uses before registration	0	reg. not required	25	10	25
Sample charts of accounts	90	3	100	64	26
Import formats	text, Quicken	text	text, QIF, TAL	text	IIF, Quicken
Multiuser	●	●		●	
DAILY-USE FEATURES					
Invoices	●	●	●	●	●
Checks	●	●	●	●	●
Purchasing	●	●	●	●	●
Bank-statement reconciliation	●	●	●	●	●
Flexible accounting periods	●		●		●
Payroll	†	§	●	●	●
Inventory	●	●	●	●	●
Flexible recurring transactions	●		●		●
Password-protected areas	over 100	2	over 100	8	4
ANALYSIS CAPABILITIES					
Profit/loss	●	●	●	●	●
Balance sheets	●	●	●	●	●
Detail zoom on reports	●		●		●
Report batches			●	●	
Save reports as text files	●	●	●		●
Cash-flow forecast			●	●	●
Budget analysis	●	●	●	●	●
Job tracking		●	●	●	●
TECH SUPPORT BY PHONE					
Length of free period	30 days	60 days	15 minutes in first 30 days	30 days	unlimited
Cost after free period	$35/call or $129/year for 5 calls	$2/minute or $79/year	$30/15 minutes; $100/60 minutes	$3/minute; $129/75 minutes	NA
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*Multiuser package includes server software. †Big Business can import payroll data from two packages: Aatrix's Ultimate Payroll ($399 list) and CheckMark Payroll ($199 list). §Payroll for MultiLedger is available from CheckMark in a separate product, CheckMark Payroll ($199 list).

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CIRCLE **126** ON READER SERVICE CARD

NEW SECTION!

V.34 Plus Modems: Full Speed Ahead

For serious Web surfers, a high-speed modem is more a necessity than a luxury.

PHOTOGRAPHY / MICHAEL FALCONER

WITH THE EXPLOSIVE GROWTH of the World Wide Web, more and more users who connect to the Internet via modem are becoming painfully aware of the bottleneck their modems pose when it comes to data transfer. The latest crop of high-speed, V.34 Plus modems is designed to help alleviate this problem. They promise data-transfer rates as high as 33.6 kbps (33,600 bits per second) — that's as fast as an ideal phone line can currently accommodate. But do the new modems deliver on their promise? And what kinds of speed gains can users expect in real-world use?

MacUser Labs put seven new modems — four V.34 (28.8 kbps) and three V.34 Plus (33.6 kbps) — through their paces, examining speed, reliability, fax capabilities, and other features. What we found is that a 33.6-kbps modem *may* be able to provide higher throughput than its 28.8-kbps cousin on a given line under certain conditions, because of the former's improved ability to handle line impairments. In order for it to achieve those speed gains, however, much depends on the quality of the phone lines over which you're transferring data.

Modem Distinctions

In general, modems fall into two classes — industrial-strength and consumer-grade. Only one of the modems we tested, the AT&T/Paradyne Comsphere 3825Plus, is a true industrial-strength product. At $595, it's the most expensive in the group, but that's because it's aimed at business environments in which modems are shared, so it comes with network-security and -diagnostic software and a *watchdog timer,* which can reset the modem if it runs into trouble.

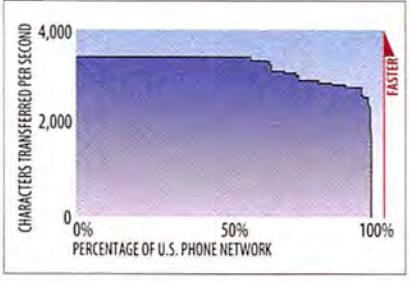
If you're in the market for a single-user modem and you subscribe to America

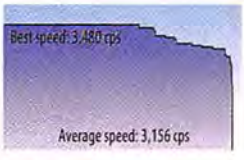
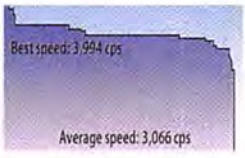
FEATURES OF V.34 AND V.34 PLUS MODEMS

To test each modem's ability to connect properly, we made 119 calls over seven combination lines. In our speed tests, results (right) show the best and the average speeds (in characters per second) for each modem over a wide variety of line types in the U.S. phone system. The larger the dark-blue area, the better the performance.

✓ MacUser BEST BUY
*V.34 Plus (33.6 kbps)

Key



	✓ AT&T/Paradyne Comsphere 3825Plus*	Diamond Multimedia SupraSonic 336V+*
Rating	♦♦♦♦	♦♦♦
Performance		
List price	$595	$289
Data-pump manufacturer	Paradyne	Rockwell
Processor manufacturer	Motorola	Rockwell
Number of status indicators	13	0 (indicators in LCD)
Alphanumeric LCD		●
Speed indicators	●	●
Flash ROM included	●	●
Caller-ID support	●	●
Volume-control switch/dial	●	●
Warranty	2 years	5 years
Company	Paradyne Largo, FL 800-482-3333 813-530-2000 813-530-2103 (fax) http://www.paradyne.com/	Diamond Multimedia Vancouver, WA 800-727-8772 360-604-1400 360-604-1401 (fax) http://www.supra.com/

Online or CompuServe, you'll definitely benefit from the speed of one of the consumer-grade 28.8-kbps modems, since those online services now support 28.8-kbps access. If you have a SLIP or PPP account with an Internet service provider and you're currently using a 9.6- or 14.4-kbps modem, you can boost access speed significantly by using a 28.8- or 33.6-kbps modem, provided that your service provider uses comparable-speed modems. That's because, in order to take advantage of a 28.8-kbps modem, you need a pair — one on each end of the phone connection. The same situation holds true for 33.6-kbps modems.

The three 33.6-kbps modems included in our test group were the AT&T/Paradyne Comsphere 3825Plus, the Diamond Multimedia SupraSonic 336V+, and the Multi-Tech MultiModemZDX.

Making the Connection

With one exception, all of the modems performed admirably in our connection-reliability tests, which are designed to find the percentage of calls for which data is transferred correctly. The Multi-Tech MultiModemZDX ran into serious trouble with several of our combination test loops and had problems making connections much of the time.

Beyond speed and reliability, you'll want to consider the features you get with a modem package. Modems with flash ROM let you quickly and easily upgrade their firmware by downloading new software as advances are made. Two of the modems we tested — the Diamond Multimedia SupraSonic 336V+ and the Practical Peripherals MacClass MC288LCD V.34 — come with LCDs. The displays provide valuable alphanumeric information about the connection in progress, which makes troubleshooting easier.

All the modems we tested come with fax software, but only one package stood out from the pack. Not only was the Global Village software package one of the most fully featured we tested but it also worked flawlessly — something we can't say of most of the others. The Diamond Multimedia modem's fax software was packed with features, but its quirky behavior detracted from its overall usefulness. Be sure to check out the various software bundles as you're shopping for a modem — in addition to fax software, many modems come with useful collections of Internet utilities.

smart shopper

5 questions to ask when you're shopping for a consumer-grade modem:

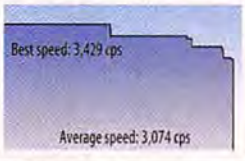
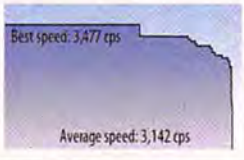
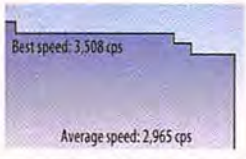
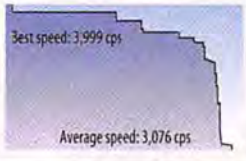
1. Does the modem have flash ROM?
2. Does the modem have an LCD, for easy troubleshooting?
3. If you need Apple Remote Access, does the modem come with the necessary CCLs (connection control languages)?
4. If you access the Internet via a service provider, is the modem compatible with the service provider's modems?
5. What value-added software is bundled with the modem?

The Bottom Line

If you're looking for an industrial-strength model, you can't go wrong with the AT&T/Paradyne Comsphere 3825Plus. It's fast and reliable and also comes with an arsenal of network-management tools.

For consumers, the Practical Peripherals MacClass MC288LCD V.34 is a steal at $149. Its fax software works like a charm, and the LCD for troubleshooting is icing on the cake.

/ SUSAN JANUS

Global Village TelePort Platinum Internet Edition	Motorola Power 28.8	Multi-Tech MultiModemZDX*	✓ Practical Peripherals MacClass MC288LCD V.34	U.S. Robotics Sportster for Mac
★★★½	★★★½	★★½	★★★★	★★★½
				
$240	$395	$399	$149	$220
Rockwell	Motorola	AT&T	AT&T	Texas Instruments
Rockwell	Motorola	AT&T	AT&T	U.S. Robotics
3	8	10	8	7
			●	
●		●		
●	●			
●	●			
				●
5 years	5 years (parts and labor)	10 years	lifetime	5 years
Global Village Communication Sunnyvale, CA 800-736-4821 408-523-1000 408-523-2407 (fax) http://www.globalvillage.com/	Motorola Info Systems Group Huntsville, AL 800-566-3266 205-430-8000 205-430-8926 (fax) http://www.mot.com/modems	Multi-Tech Systems Mounds View, MN 800-328-9717 612-785-3500 612-785-9874 (fax) http://www.multitech.com/	Practical Peripherals Norcross, GA 770-840-9966 770-734-4601 (fax) http://www.practinet.com/	U.S. Robotics Skokie, IL 800-342-5877 847-676-7010 847-676-7320 (fax) http://www.usr.com/

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The Visual Computing Software Company

CIRCLE **81** ON READER SERVICE CARD

Adobe PageMaker and QuarkXPress are great for print publishing, but can you use those pages on the Web? Conversion tools help your layouts make the leap.

By William Harrel and Scholle Sawyer

From Printed Page to Home Page

THE WEB IS WAITING, and so are your clients. After slaving over documents in Adobe PageMaker or QuarkXPress, you may be wondering what the most effective way is to get those pages up on the Web. Unfortunately, there's still no magic Save as Web Page button to click on. That's why most designers end up remaking their pages in a straight HTML-authoring program, such as Bare Bones' BBEdit, or a WYSIWYG application, such as Adobe PageMill.

If you're set on leveraging off your existing documents, you essentially have two options. You can use a tool that converts your page-layout files to HTML — an XTension for QuarkXPress or a plug-in for Adobe PageMaker or FrameMaker (the unsung hero of page layout). Or you can use non-HTML alternatives for Web authoring, such as Adobe Acrobat and QuarkImmedia. The latter tools let you make files that are accessible from the Internet but that require special viewers (see the "Road Less Traveled" sidebar).

Repurposing tools sounded almost too good to be true, so we put them to the test with a six-page magazine laid out similarly in QuarkXPress, PageMaker, and FrameMaker. The results were mixed, but most of the tools we looked at shared one advantage — they do automate time-consuming tasks. They all convert text to HTML, most convert text styles to HTML code, and many convert graphics to Web-ready formats as well.

None of these tools can do all the work for you, but they do help. Plus, they can save you the expense of purchasing an arsenal of tools that could include a graphics converter, a graphics-transparency tool, an image-map creator, and an HTML editor — not to mention the RAM to run it all.

From QuarkXPress to HTML

QuarkXPress has more conversion options than does PageMaker, thanks to the many developers who take advantage of its extensible architecture. Astrobyte currently leads the XTension pack, with BeyondPress, but HexMac's HexWeb is a promising newcomer.

BeyondPress 2.0. The most designer-friendly conversion program we looked at, BeyondPress aims to be a one-stop application for converting QuarkXPress documents to the Web. This XTension is easy to use, and you can do a lot with it before resorting to hand-coding in HTML or opening up Photoshop.

BeyondPress converted all our graphics to either of the Web-ready formats, JPEG and GIF, and then let us choose a color palette (the cross-platform adaptive palette or the Mac OS palette) for each GIF and a compression level for each JPEG. We could scale and crop images and decide whether our headlines should be treated as graphics or as HTML text.

Most impressively, the Group Image feature let us group our cover image, logo, and lines together in QuarkXPress and then export them as a single image. We then could easily turn the cover into an image map within BeyondPress. No other tool offered this kind of creative solution (see figure 1).

BeyondPress also maps font sizes to HTML styles, so all our headlines and decks converted automatically, as did bold and italic styles. The results were unruly — BeyondPress understands font names and styles, but not all fonts are named correctly by the manufacturer, so we had to tinker to make the text look right.

BeyondPress does not provide tools to help organize complex sites, but for our short project, it excelled at image-quality controls and creative layout options. A pared-down version of BeyondPress — CyberPress, from Extensis — will also be available this fall,

ILLUSTRATION / ELIZABETH LADA

bundled with Adobe PageMill 2.0. (Check out the Extensis Web site, at http://www.extensis.com/, for more information.)

HexWeb XT 2.1. The focus of this program is not precise control over graphics but the quick creation of highly structured Web sites. HexWeb requires a lot of planning and programming on the front end, but such efforts pay off. Once you've set up your site, HexWeb will automatically confirm all your links and, most impressively, create a table of contents for each issue of your publication.

To set up our site with HexWeb, we had to create a template first, by defining sections; coding their headers and footers; and determining the look of our table of contents, which could even include frames.

We felt a little overwhelmed by the coding necessary to get our magazine going and longed for a Webmaster comfortable with the variables that make the program work.

Making pages was quite a bit easier. We selected the article's category to determine the article's place in the table of contents and the header and footer it would receive (see figure 2). Then we scrolled through our document and defined elements (graphics and text) as GIFs or JPEGs. To export elements, we selected the boxes in the order we wanted them to appear on the page. It wasn't easy to experiment — if we didn't like our results, we had to select everything over again — but our initial template limited our layout choices anyway.

Handy text-formatting options included automatic left indents and drop caps. HexWeb also let us keep graphics and captions together in a table by choosing a simple menu option — that saved us a lot of time.

HexWeb's emphasis is not on graphics. The Mac OS color palette is your default — which means graphics won't look great on Windows machines — and you have no control over the quality of your JPEGs or rasterized text. We could size our graphics but had to go outside the program to do cropping or image maps.

The work HexWeb takes on the front end, and the organizing benefits it returns, seemed to make more sense for newspapers and other publications trying to get material online quickly than for our modest test magazine.

From PageMaker to HTML

Unfortunately, there haven't been a lot of PageMaker plug-ins available, so when converting those layouts to Web pages, you've pretty much been stuck with HTML Author, which ships with PageMaker 6.0. Help is on the way later this fall with PageMaker 6.5, which promises more-extensive HTML-conversion options.

HTML Author. Not designed to turn existing documents into Web pages, this plug-in requires that you design your document from the ground up in anticipation of using HTML Author. For the conversion to go smoothly, the document must be quite simple.

To convert our layout, we had to use Photoshop to convert all the images to GIF or JPEG. Then we had to place them as in-line graphics next to associated text such as captions. But initially we almost wound up laying the document out all over again, because when we tried to make the conversion without taking these steps, we got a jumbled HTML page with no images and with captions and department headings in all the wrong places.

Once the PageMaker document is in a usable format, making the conversion is fairly simple, but the ensuing Web pages are not works of art (see figure 3). HTML Author does not support many HTML formatting features — such as tables, frames, and image maps. When you open the program, it gives you a list of design elements in your document that HTML Author doesn't support. Our list was extensive, including "Multiple columns," "Text wrapping of graphics," and many others.

Creating links is also laborious. To add a link, you must close HTML Author, select the text or image you want linked, and then reopen the plug-in to assign the link. You must repeat this process for every link on your page.

Rather than trying to use HTML Author, PageMaker users may have better luck if they

figure 1 / Astrobyte's **BeyondPress 2.0** offers some unique features for graphics conversion. Here we turned the QuarkXPress boxes on our cover into a single image. That made it easy to create an image map.

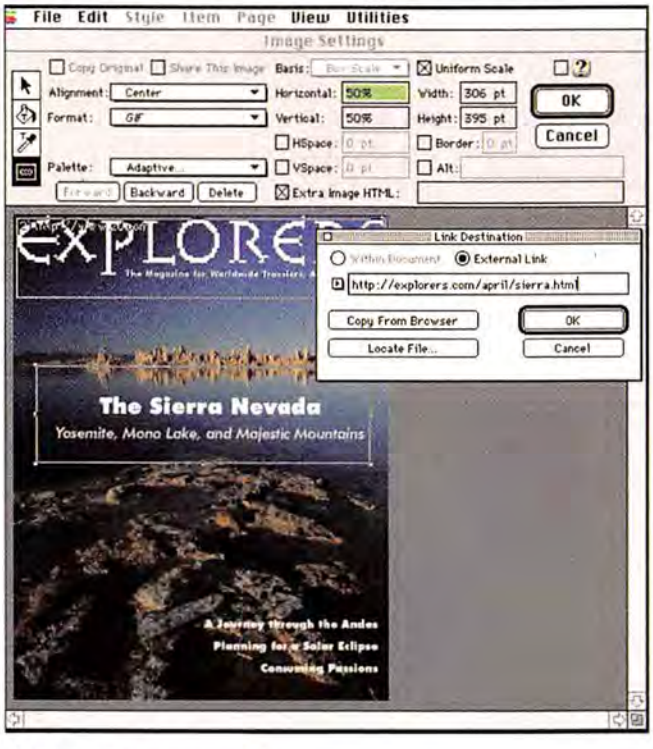
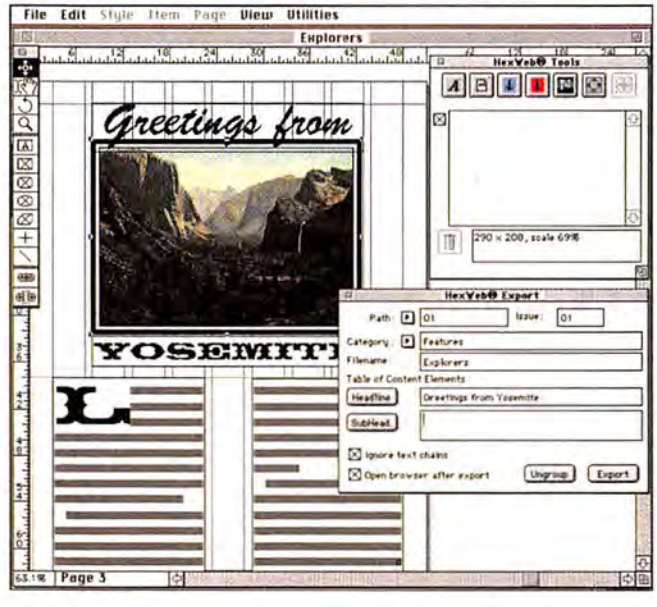


figure 2 / HexMac's **HexWeb XT 2.1** XTension for QuarkXPress creates highly structured Web sites. Before selecting elements from our page for conversion, we entered the article's headline, category, and issue. HexWeb uses this information to automatically generate a table of contents.



start over in an application such as PageMill. A more workable solution is to choose a non-HTML alternative and convert your layouts to Adobe Acrobat's Portable Document Format.

PageMaker 6.5 with HTML Author. When it's released in November, Adobe PageMaker 6.5 promises to solve many of HTML Author's problems. This version of PageMaker is designed to be Web-friendly — even to the point of supporting hypertext links — and users of Adobe PageMill and SiteMill will be able to drag and drop among all three programs.

In preparation for repurposing, PageMaker 6.5 will automatically reformat layouts by adjusting page elements to fit the dimensions of a browser window and lining the elements up for export. The upgraded HTML Author will convert graphics to JPEG or GIF and will support hyperlinking. At press time, we'd seen only a beta version of PageMaker 6.5, but it looked promising (see News in this issue).

The Road Less Traveled / non-HTML alternatives for the Web

FINDING A WAY AROUND the layout limitations of the Web comes at a cost. Non-HTML alternatives for delivering content over the Internet, such as Adobe Acrobat and QuarkImmedia, require extra applications that most of today's Web surfers don't have on their computers. Despite this drawback, both Adobe Acrobat and QuarkImmedia offer special benefits and may be suitable for some projects.

Adobe Acrobat 3.0. Adobe Acrobat's Portable Document Format (PDF) re-creates documents on a computer screen exactly as they look when printed. Using Adobe Acrobat is the easiest and most efficient way to get your PageMaker documents on the Web, but in truth, you can turn *any* document into a PDF file with the right tools. The beauty of PDF is that if you start with a classy, well-designed layout, your PDF layout will look just as good.

You'll find PDF documents all over the Web, but their major drawback is that visitors to your site must have either the Acrobat Reader or the new Acrobat 3.0 plug-in installed to view PDF layouts.

QuarkImmedia. Quark's new multimedia XTension for QuarkXPress shares Adobe Acrobat's problems but provides different benefits. QuarkImmedia offers more than just a way to repurpose QuarkXPress documents; it lets you turn those documents into multimedia presentations that can be viewed over the Web.

As with Adobe Acrobat files, visitors to your site must use a viewer to interact with QuarkImmedia files. But *interact* is the key word here — to take advantage of QuarkImmedia's potential, you'll want to add video, sound, and animation to your original document. This opens a whole new realm of possibilities for intrepid QuarkXPress designers.

If you're an experienced QuarkXPress user, you won't have much trouble learning to use QuarkImmedia, but you will have to spend time gathering or developing extra materials. QuarkImmedia projects also download quite slowly under current bandwidth limitations, so you need to plan carefully to minimize your file sizes.

QuarkImmedia and Adobe Acrobat offer very different alternatives for repurposing or even expanding your page-layout documents for the Web. These pages probably won't draw as much traffic as HTML pages, but sometimes the road less traveled can offer a more interesting trip.

From FrameMaker to HTML

Adobe FrameMaker is well known among people who create highly structured technical manuals, and its inherent concern with structure makes its documents good candidates for HTML conversion. FrameMaker already creates hypertext indexes, tables of contents, and other lists. This makes it very suitable for generating huge Web sites made up of multiple sections, pages, and URLs.

All three plug-ins we looked at — Quadralay's WebWorks HTML Lite and WebWorks Publisher 2.2 and Harlequin's WebMaker 2.1 — also take advantage of FrameMaker's reliance on macros to do complex conversion tasks and to automatically convert hypertext links to URLs.

WebWorks HTML Lite. Bundled with FrameMaker, WebWorks HTML Lite is much like PageMaker's HTML Author. It allows you to map paragraph styles (called formats in FrameMaker) and export text and previously converted GIF files to HTML. The comparison to HTML Author doesn't stop there: All text and images must be placed in the order in which you want them to appear, and all graphics must be in-line, or anchored. We had to rearrange our test document's layout to get the desired conversion (see figure 4).

WebWorks Publisher 2.2. If you use this powerful plug-in's default conversion options, WebWorks Publisher is fairly easy to use, but getting the most from it means creating macros and learning scripting. It's customizable, so you can write macros for newer HTML codes, such as Netscape Navigator frames, that the plug-in itself does not otherwise support.

First you must make sure all the images are in-line. To convert documents, you create a File Set, which consists of your FrameMaker document as well as a file containing a default set of commands and macros necessary to complete the conversion. Advanced design elements, such as images with text wraps, require new macros.

figure 3 / **HTML Author** creates simplistic Web pages out of PageMaker documents, after much user preparation, such as converting graphics manually and placing all text in the same story and in the desired order.

figure 4 / After considerable user manipulation of the FrameMaker document, including conversion of all images to GIFs in Photoshop, Quadralay's **WebWorks HTML Lite** performs a simple HTML conversion.

For converting images, WebWorks Publisher ships with a separate rasterizer that breaks out images and converts them to either GIF or JPEG. The rasterizer works well, but you need some knowledge of FrameMaker's scripting — or macro language — and Publisher's command conventions.

This program relies heavily on user-created macros, which adds greatly to its power but also increases its unruliness. Once we learned how to set up new macros, WebWorks Publisher worked well. We ended up with a nice-looking, well-organized Web site, complete with navigational links for our table of contents (see figure 5).

WebMaker 2.1. Even farther down the hard road to geekdom, WebMaker does its magic by using *two* scripting languages — FrameMaker's Maker Interchange Format (MIF) and WebMaker's built-in WebMaker Language (WML), an ASCII-based page-description language. Before converting your document, you must first save the FrameMaker file in MIF format and then convert the file in WebMaker.

Setting up custom WML commands to convert your documents is complicated — especially because you have to do the work in the less familiar WebMaker. You can create a set of rules — or statements mapping paragraph formats to HTML codes — that match the FrameMaker paragraph and character styles (see figure 6) and then save it as a WML file.

For our test document, we had to create new rules unavailable in the defaults provided and map the rules to the existing FrameMaker formats to get the test document to convert as we wanted. We also had to modify the FrameMaker layout so that all images were in-line.

Our graphics also required some work. WebMaker does not render low-resolution versions of images, although it does convert them to GIF. The WebMaker documentation suggests using FrameMaker's Variable script command to import two versions of the image files: high-resolution, for printing, and low-resolution, for HTML conversion.

It took us quite some time to figure out how to convert our test document successfully with WebMaker, perhaps twice as long as it would have taken to lay the document out again from scratch in Adobe PageMill. The benefit of WebMaker, however, is that you can save the conversion rules and use them again. For organizations that have a lot of documents to convert, this could be a good approach.

Adobe HoTaMaLe. By the time you read this, Adobe will have released HoTaMaLe, a FrameMaker plug-in that will convert documents in one step, with the Save As dialog box. According to Adobe, HoTaMaLe will convert FrameMaker documents with little fuss. It will include hypertext and image conversion to Web formats and will allow you to share HTML mapping among multiple FrameMaker documents. Considering the complicated solutions available to date, HoTaMaLe may be the best one for designers who are not programming-savvy but who need to convert existing FrameMaker documents to HTML.

Undergoing Conversion / where to find products mentioned

IF YOU WANT TO TEST-DRIVE a conversion tool before you buy, check the company's Web site. Most companies let you download a demo version of the product and have examples for you to pore over.

Adobe Acrobat 3.0, $295
Adobe HoTaMaLe, free
HTML Author, free with PageMaker
Adobe Systems
Mountain View, CA
800-272-3623 or 415-961-4400
http://www.adobe.com/

BeyondPress 2.0, $595
Astrobyte
Denver, CO
303-534-6344
http://www.astrobyte.com/

HexWeb XT 2.1, $349
HexMac
Stuttgart, Germany
http://www.hexmac.com/

QuarkImmedia, $995
Quark
Denver, CO
800-788-7835 or 303-894-8888
http://www.quark.com/

WebMaker 2.1, $99
Harlequin
Cambridge, MA
617-374-2400
http://www.harlequin.com/

WebWorks HTML Lite, free with FrameMaker
WebWorks Publisher 2.2, $895
Quadralay
Austin, TX
512-719-3399
http://www.quadralay.com/

Final Thoughts

In truth, the Web waits for no one. Browser companies announce new Web-layout options — such as tables and frames (yes, they, too, were once new!) — more quickly than most plug-in and XTension companies can turn out tools. Although all the programs we looked at take some of the drudgery out of converting your layouts to HTML, the bottom line is that if you want to be cutting-edge, you're still going to have to know the code.

William Harrel is a Web-page designer and the author of 15 books, including The PageMaker 6 Bible. *MacUser Assistant Editor Scholle Sawyer edits an e-zine, The Nerve.*

figure 5 / After much user manipulation and configuration, Quadralay's **WebWorks Publisher 2.2** performs sophisticated Web-page conversions.

figure 6 / Harlequin's **WebMaker 2.1** uses a set of predefined or user-defined rules to convert FrameMaker layouts to HTML.

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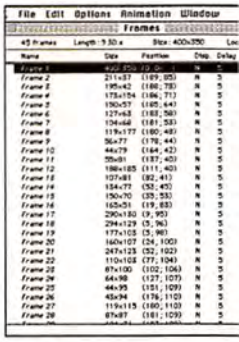
System Requirements

Mac Operating System	System 7.1 or greater
CPU Type & Speed	68040 25MHz
Hard Drive Space	2 MB
Memory	8 MB (5000K free)
Graphics	640X480X256
CD-ROM Speed	2X
Audio	8 BIT (16 Preferred)
Other Needs	Quicktime™ 2.1 Sound Manager 3.1 (both included)

8

1. CREATE YOUR FRAMES, AND COLLECT THEM IN GIFBUILDER.



Animating GIFs for the Web

Use GIFBuilder 0.4's little-known features to create lean Web animations.

THE EASY WAY to bring animation to your Web page — without monkeying around with programming — is to create animated GIFs. These clever files, known as GIF89s to the more technically inclined, work like old-style flip books. But whereas flip books make characters appear to jump and run through the rapid blurring of pages, animated GIFs hold multiple images within one file and make characters move by displaying one frame while loading the next. This means that instead of making the viewer twiddle thumbs while the file downloads, the animation plays *as* it downloads.

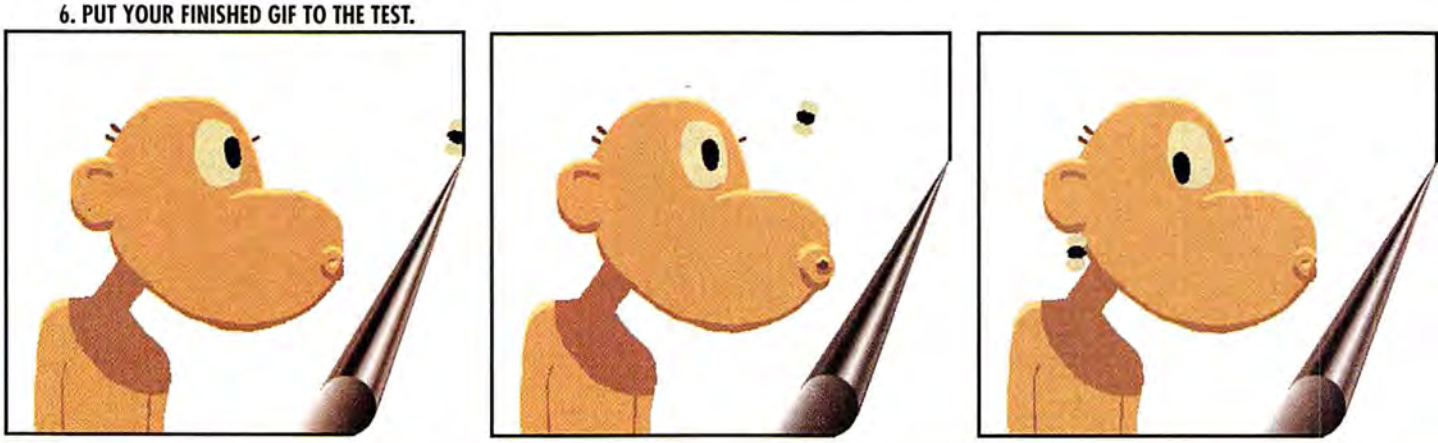
Netscape Navigator 2.0 and Microsoft Internet Explorer now support animated GIFs, so most Web wanderers can see the animations go through their motions. Browsers that don't offer such support, such as NCSA Mosaic and AOL, load only the first frame. That's still not a bad deal, considering that animations created in other ways (such as with Java and Macromedia Shockwave) require plug-ins or server scripts and are generally much harder to create. Unlike some other types of animation, however, animated GIFs are not interactive.

All you need for making an animated GIF is GIFBuilder 0.4 — a free, Mac-only program by Yves Piguet, available online at http://iawww.epfl.ch/Staff/Yves.Piguet/clip2gif-home/GifBuilder.html. Because GIFBuilder comes with little documentation, few users are aware of the program's advanced features — which let you dramatically decrease file size. On the Web, every kilobyte counts.

This example of original artwork by illustrator Bruce Heavin uses GIFBuilder's advanced features to transform a 503K QuickTime movie with 46 frames into a 39K animated GIF.

Digital designer Lynda Weinman is the author of <designing web graphics>. *To learn more about Web-design tips and tricks, take a look at her Homegurrrl Page, at http://www.lynda.com/.*

6. PUT YOUR FINISHED GIF TO THE TEST.



STEP BY STEP

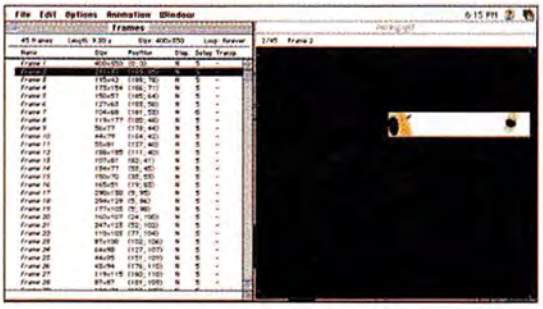
1. CREATE YOUR FRAMES, AND COLLECT THEM IN GIFBUILDER. We created our monkey in Photoshop and set up the animation sequence in Adobe After Effects, but you can create individual frames in most drawing or graphics programs. GIFBuilder 0.4 accepts files in QuickTime and GIF formats as well as TIFF and Photoshop documents in RGB, grayscale, or indexed color. Drag and drop your frames into GIFBuilder's Frames window (Window:Show Frames). Once opened in GIFBuilder, our QuickTime movie converted automatically into 46 individual frames.

2. SET YOUR BASIC OPTIONS. GIFs by nature are, at most, 256 colors and must have an assigned palette. We used the System palette (Options:Colors:System Palette). GIFs can also be made transparent — transparent GIFs appear to sit directly on the page, because their background color matches the Browser's. We chose to keep the monkey's white background (Options:Transparent Background:No). We then set the animation to repeat itself for as long as the Web page stays open (Options:Loop:Forever).

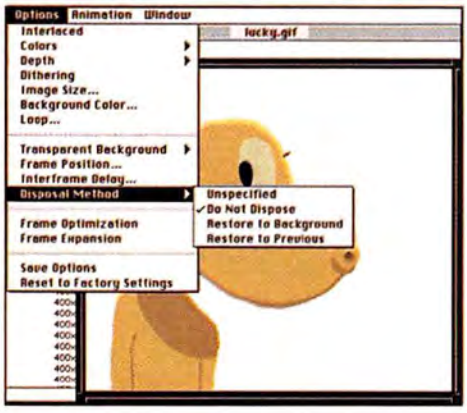
3. SHRINK YOUR FILE SIZE BY CHOOSING FRAME OPTIMIZATION. Here lies the biggest secret of lean animated GIFs. By turning on this feature (Options:Frame Optimization), you instruct GIFBuilder to isolate elements in your animation that actually change position — in our

2. SET YOUR BASIC OPTIONS.

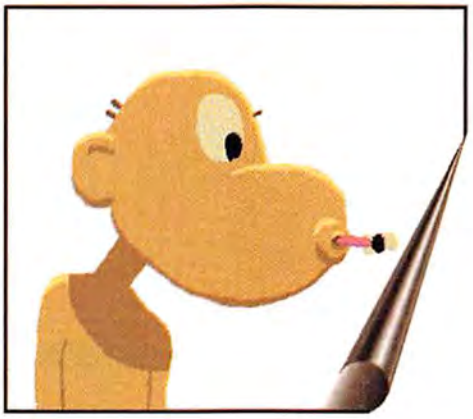
3. SHRINK YOUR FILE SIZE BY CHOOSING FRAME OPTIMIZATION.

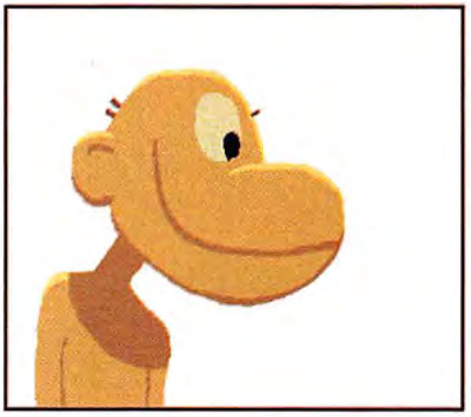


4. PICK THE RIGHT FRAME DISPOSAL METHOD.



5. CREATE THE EFFECT YOU WANT BY TINKERING WITH INTERFRAME DELAY.





example, the fly and the eye. GIFBuilder crops away everything else in all frames but the first. The first frame serves as background, and the subsequent small frames lie on top of and add to it. File size shrinks dramatically, because you don't store the entire background in every frame.

4. PICK THE RIGHT FRAME DISPOSAL METHOD. Disposal method determines what GIFBuilder does with each frame after the frame is displayed. Some general rules of thumb: *Unspecified* works best if you have not used Frame Optimization or transparency; *Do Not Dispose* works best with Frame Optimization and transparency; *Restore to Previous* works best when you've moved an object around manually with Frame Position (Options:Frame Position).

5. CREATE THE EFFECT YOU WANT BY TINKERING WITH INTERFRAME DELAY. You can choose various delays between any frames for whatever effect you'd like (Options:Default Interframe Delay). We emphasized the tongue catching the fly by holding that frame on the screen longer.

6. PUT YOUR FINISHED GIF TO THE TEST. Preview your animation to see if it works (Animation:Start). You can fine-tune by advancing frame by frame (Animation:Step). Always make sure to test your animated GIFs in a browser before you post your animation to your Web server.

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MacWEEK ◆◆◆◆ MacUser

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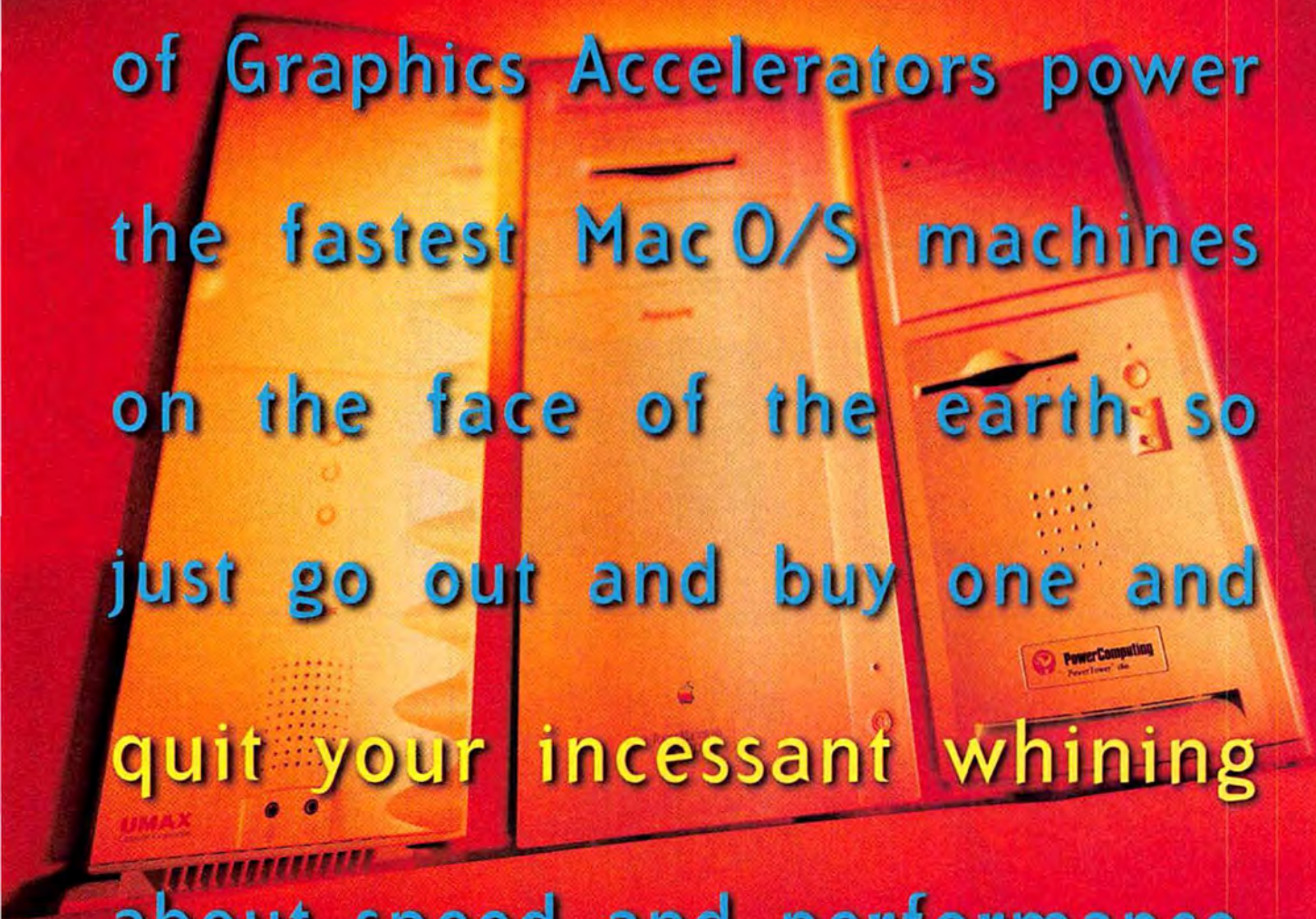

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EXPERT TIPS / By Bob Schaffel and Chuck Weger

Crossing the PC Rubicon

How do you work with files in PC territory? Pay attention to those file formats.

LAST MONTH, WE COVERED getting your files from a Mac to a PC and vice versa. But it's not enough just to get the bits over to the other side; your applications have to be able to use them once they're there.

With some kinds of files, crossing platforms is not a problem. Many office applications (including Microsoft Office, Corel WordPerfect, Claris FileMaker Pro, and ClarisWorks) have file formats that work across platforms or have within-application utilities that handle conversion. And most page-layout applications (Adobe PageMaker and FrameMaker, QuarkXPress, and so on) have evolved to the point where they use a common file format for their Mac and PC versions, so you can open your QuarkXPress PC file on your Mac (and vice versa) without hassles.

But just because you can open the document file doesn't mean that the things *inside* the document come across correctly. Placed graphics and fonts — the two elements that commonly make up most of a page — aren't necessarily transportable.

For instance, if you want to silhouette a photo in Adobe Photoshop and then place it in a QuarkXPress file, you must save it in EPS format (it's the only way the clipping path associated with the silhouette can be saved). This is all well and good, except that when previewing EPS images on-screen, Macs use the PICT format to display the preview whereas PCs use TIFF. If you migrate the QuarkXPress page to a different platform, you'll see a gray tint rather than the image. This makes repositioning, sizing, and cropping something of a Zen experience. (Although you can't see it on-screen, the image will output correctly.) Unfortunately, there's nothing you can do about it but be aware.

And while we're at it, a TIFF on a PC is not the same thing as a TIFF on a Mac. You (or the programmers who created your software) need to be aware that the TIFF specification is really a library of formats. Although Photoshop is able to read a variety of TIFFs, not all illustration applications can. So keep in mind that Photoshop, which can save files in PC-friendly formats, can be used as a TIFF translator.

ILLUSTRATION / STU SUCHIT

Mostly TrueType Stories

Fonts also provide interesting grist for the compatibility mill. A myriad of font-related things shift when moving work from a PC to a Mac or vice versa. Pay attention to the names of your PostScript fonts. Times Roman (Mac) and Times New Roman (PC) may look and behave the same way on-screen, but their outline fonts, which are necessary for printing, may be different entities. If the PostScript names are different, the proper outlines may not be found at print time.

Font encoding is a way of mapping the code generated by your keystrokes to the characters that make up the font. But coding is not consistent between Macs and PCs, so what you see on one platform may not be what you get on the other. Likewise, there are special type characters available that will not translate properly when files are moved from one platform to the other. For example, text containing bullets, fractions, typographic quotation marks, accented characters, and other special symbols should set off warning bells in your head if the document will be edited or produced in a multiplatform environment.

TrueType is another source of potential problems. (By the way, we recommend that you don't use TrueType if you're going to be printing at high resolutions.) Once again, the specification for TrueType on a PC is different from that on a Mac. In the case of TrueType, even though you might not have a naming problem, you still run the risk that lines of text will break differently than expected due to incompatible font metrics.

You might be wishing that someone would establish some standards. Well, actually, even though there are gotchas with standard graphics formats such as TIFF and EPS and font standards such as PostScript Type 1, at least we're able to use them cross-platform.

Finally, keep in mind that we graphic-arts people don't have it nearly as bad as the poor video folks. Many compressed-video formats aren't directly transportable from the Mac to the PC, and major parts of an Adobe Premiere project (such as the construction window and a clip's motion, for example) can't be transferred at all. Dealing with this would be like having to re-create a page layout from scratch on the other platform!

So when you move your files from the PC to the Mac or back, be careful out there. It never hurts to perform some tests before you lock yourself into some impossible deadline. As Chuck was recently told by an Adobe tech-support representative (and we quote), "You're pretty much on your own when you go cross-platform."

Bob Schaffel is emerging-technologies consultant for R. R. Donnelley & Sons. Chuck Weger is a graphic-arts consultant and a partner in Genex Media, a company specializing in new media and Web design.

Decisions. Decisions.

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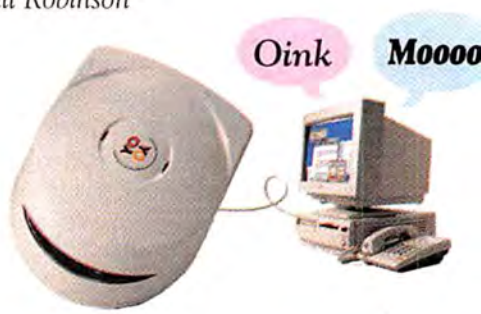

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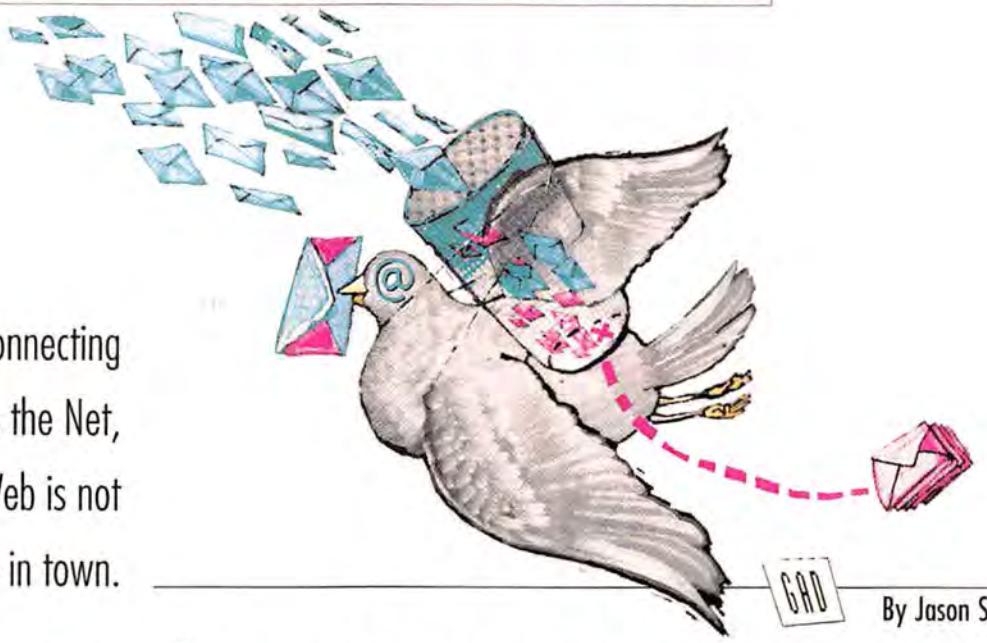
NETWORKING



When it comes to connecting with people on the Net, the World Wide Web is not the only game in town.

By Jason Snell

Internet Mailing Lists Made Easy

IF YOU WANT TO INTERACT with other people, electronic mail is probably the most effective way of communicating on the Internet. Whether you're discussing the merits of your company's new product with customers or trading trivia about your favorite television personality, you can use electronic mailing lists as forums for conversations. And best of all, you can run the lists right from your Mac.

I've Got a Little List

Your first task as a potential list manager is to decide what kind of mailing list you'd like to run. Besides choosing a topic for your list, you need to decide whether it will be a broadcast or a discussion list. If you're interested in distributing announcements or perhaps an e-mail-based publication, you'll want to create a *broadcast* list — messages are sent by you to dozens or hundreds of people who've subscribed to your list. Online magazines, such as the Mac newsweekly, TidBITS, use this type of list. Most mailing lists, however, are *discussion* lists — they allow any list member to send a message to everyone else on the list, creating an online community that's great for discussing common interests.

There's a big catch, though: Mailing lists that have lots of members can attract dozens of messages every day, and these can flood subscribers' in boxes in a hurry. To stem the tide of e-mail, many discussion lists offer users the option of subscribing to a *digest* version. Digest subscribers regularly receive a single e-mail message containing all the latest messages sent to the list.

Nuts and Bolts

To get your list up and running, you need a minimum of two new POP (Post Office Protocol) accounts from your ISP (Internet service provider), a dedicated or frequent Internet connection, and Mac-based mailing-list-management software.

Every mailing-list server performs at least two tasks. First, it lets users add and remove themselves (in list jargon, *subscribe* and *unsubscribe*) to and from mailing lists. Second, the server sends messages to and receives them from list members. You use one POP account for each of these tasks. Name the administrative account something such as listname-request and configure it to manage subscriptions for your list. Your list's primary e-mail address (of the form listname@server.com) sends messages to and receives them from members, once they've subscribed.

Mail addressed to your list and sent from it is either distributed by Mac-based mailing-list software alone or through the combined efforts of your Mac server and the ISP's server (which is probably running UNIX). Like e-mail client software (Qualcomm's Eudora, for example), some Mac server software uses POP to transfer mail to an ISP's server, which uses SMTP (Simple Mail Transfer Protocol) to connect to every list member's mail server and to send or receive messages. The Mac server's job is to fulfill subscription requests and to send incoming messages back to the list.

If you're planning to create a broadcast list or a discussion list that has very little traffic, you can use a Mac POP server and run the list without having a continuous connection to the Internet. The SMTP server will hold mail addressed to your list until your POP software connects to the server and processes the mail. Keep in mind, though, that this arrangement will slow down communication on your mailing list: New messages won't be posted until the next time you connect, and this time lag will kill off spontaneous conversation on your list. Most discussion lists should be run by a

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machine that's on the Net continuously. You also may have to depend on the kindness or flexibility of your ISP: The volume of traffic your mailing list adds to the SMTP server may encourage the ISP to charge you a higher fee or to forbid you from using the SMTP server to run the list. It's best to learn the ground rules before you get started.

If you have a continuous Internet connection, you can run your own SMTP server. The advantage here is that your Mac-based list-server software doesn't need to rely on your ISP's mail server for receiving and distributing messages. The disadvantages are that your Mac server must be connected to the Internet at all times and distributing messages to a large number of addresses can use up a lot of horsepower and bandwidth. By contrast, POP servers need not be connected to the Net continuously (although they can be) and they're able to pass the work of distributing large amounts of mail to your ISP's mail server.

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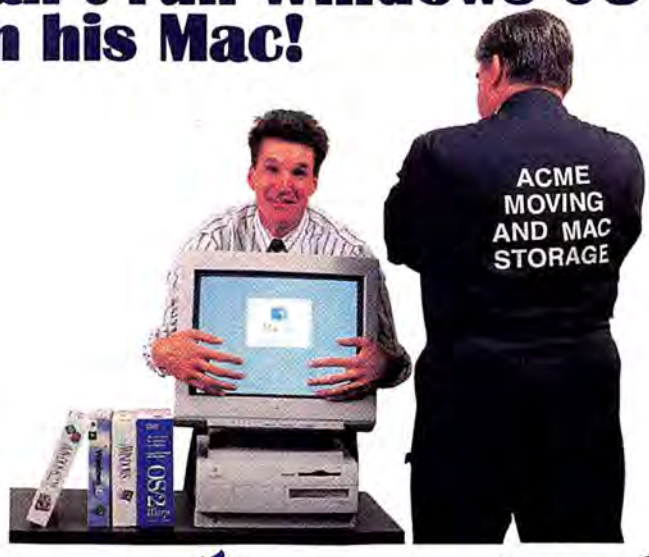

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Mac Post Office

Although it's not necessary to dedicate a Mac to your mailing list, particularly if you're connecting to the Internet only a few times a day, sharing the server with a busy user isn't a good idea either. If you already use a Mac as an Internet e-mail server, that's the place for your list-management software.

Your two best Macintosh mailing-list-management options are Michele Fuortes' free POP/SMTP-based Macjordomo (http://leuca.med.cornell.edu/Macjordomo) and Quarterdeck's ListSTAR (http://www.starnine.com/ListSTAR/). Quarterdeck offers a POP version of ListSTAR ($199), which works with any POP/SMTP mail server, and a stand-alone SMTP version ($499) as well as versions that support the QuickMail and Quarterdeck Mail systems ($199 each).

Macjordomo is a simple, easy-to-use list server. It's not very customizable, but it offers built-in support for the most common form of mailing list available on the Internet — it handles subscribing and unsubscribing requests via one control e-mail address, and it automatically creates mailing-list digests. Macjordomo uses POP and SMTP to receive and send mail, respectively.

In contrast to Macjordomo, ListSTAR is powerful yet hard-to-use software that's extremely customizable. In fact, ListSTAR's flexibility is one of the reasons it's so hard to use. Macjordomo obeys a set list of commands for adding and removing list members, but ListSTAR can follow any commands you create for it, using a rule-based interface.

ListSTAR also offers links to AppleScript and UserLand's Frontier, so you can extend its capabilities via scripting. Despite its complexity, ListSTAR's flexibility gives you the freedom to automate almost anything you can think of: create digests that go out only when the file is larger than 50K, allow users to request digests they might have missed, and so on.

You've Only Just Begun

Two years ago, running an electronic mailing list meant wrestling with a UNIX-based list server, a daunting proposition for many Mac users. Today, with such programs as Macjordomo and ListSTAR, Mac users are starting to discover that creating and running an electronic mailing list can be an incredibly rewarding experience.

MacUser *Senior Editor/Online Jason Snell has written extensively about mailing lists in* Providing Internet Services via the Mac OS *(Addison-Wesley, April 1996).*

BBEdit 4.0

"...deserves a place in everyone's HTML toolkit."

-MacUser, August 1996

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BBEdit Works Well with Others

BBEdit also works well with other applications and environments. BBEdit is AppleScript savvy, and is fully integrated with Frontier 4.0 to perform a suite of valuable web-authoring scripts. BBEdit includes tools to check your HTML syntax, so you can use it to proofread code generated by graphical HTML applications. BBEdit is also easily expanded to support new HTML conventions as they hit the scene.

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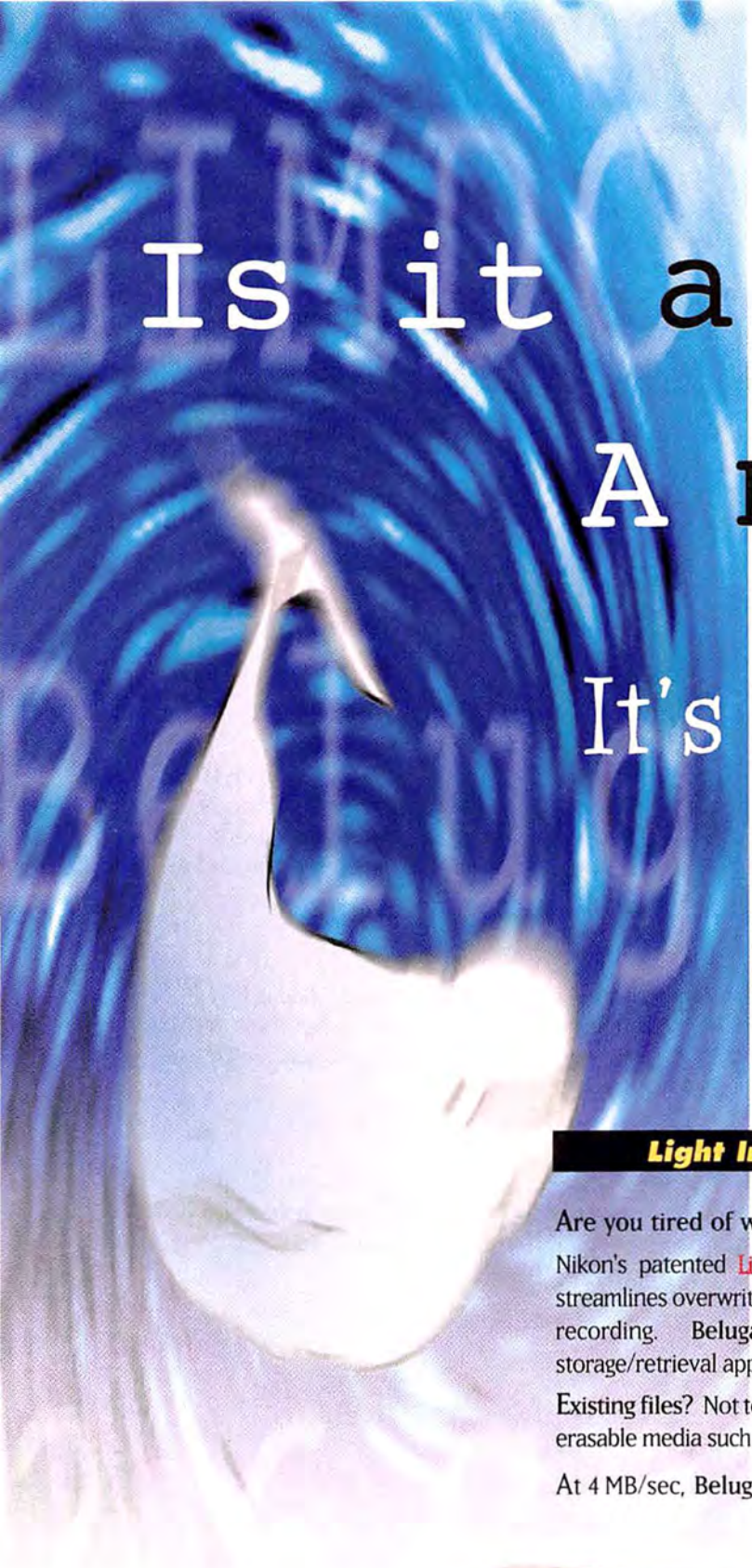

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NET TRAVELER / By Michael Swaine

Protecting Your Privacy Online

Is the Internet a sophisticated communications tool? Or is it just one big party line?

ALTHOUGH THE PARANOID'S vision of a centralized file on every citizen isn't a reality (yet), you do feed personal information to a distributed dossier each time you log onto the Net. As your activity online and the range of information collected about you increases, you may face a disturbing threat to your privacy.

What kind of information are you unintentionally volunteering? Consider your e-mail address a lost cause. At less risk (but hardly safe) from your boss, mass marketers, and Net-savvy no-goodniks are your credit-card numbers, your buying and downloading habits, the names and ages of your children, whether or not you're home right now....

Whoa! Before the paranoia meter goes off the scale, let's look at the risks and how you can minimize them.

E-Mail. E-mail is about as private as a conversation on a bus. Your message passes through any number of computers on its way to the intended recipient. At each stage, people unknown to you have access to mail queues, system-log files, and bounce messages, any of which provides windows into your mailbox.

Usenet. When you post a message to a newsgroup, you divulge your e-mail address and your interest in the group topic. Several search engines can scan Usenet by group, topic, or poster's name. Even if you're sure your boss *never* reads alt.conspiracy and will therefore never know that you're a frequent contributor during work hours, can you afford to take the chance that he or she won't perform an Alta Vista search (http://www.altavista.digital.com/)? Think before you post. Newsgroup messages are also a huge source of e-mail addresses for the growing number of mass marketers who deliver their pitches right to your mailbox.

The Web. Isn't the World Wide Web anonymous? Wake up and smell the coffee, kiddo. There are lots of ways that clicking around the Web can reveal things about you that you didn't intend to share. If you have configured your browser with an e-mail address, assume that the address is available to every site you visit. Old versions of some browsers (Netscape Navigator 2.0b2 and earlier, for example) have bugs that permit a sufficiently determined snoop to gain access to the cached history of sites you've visited or even passwords you use for accessing restricted sites. Visit http://www.anonymizer.com/ to see some of what you are revealing about yourself via the Web.

And if you find a file called MagicCookie on your hard disk, you may be surprised to learn it contains information about you — placed there by a site you visited and available for examination when you visit again. Besides building a file on you, the site is using your hard disk to store it!

Plugging Leaks. What can you do to keep your private information private? The first rule of online privacy is, don't post what you don't want made public. The Internet is a street corner, not a confessional. To prevent others from knowing with whom you are communicating, you can use an anonymous remailer (to learn more, go to http://electron.rutgers.edu/~gambino/anon_servers/anon.html). These remailer sites put messages in a digital envelope, using public-key encryption and masking the sender's identity.

Encryption is the basis of schemes that make it possible to engage in secure transactions via the Web. If you're going to give your credit-card number to anyone over the Net, be sure your browser and the site on the other end use and support secure transactions. It's a bad idea to send credit-card information via unencrypted e-mail.

If you're interested in stopping threats to privacy rather than reacting to them, stay informed about your rights and threats to them. The Electronic Privacy Information Center (EPIC), at http://www.epic.org/, is a good starting place. And you might consider working for laws that protect your electronic privacy at the state or federal level. EPIC has an index of current state privacy laws.

Outflanking Marketers. The price of a new browser plug-in or access to a cool site is often measured in information about yourself, designed to help the site's owner sell products or establish demographics for advertisers. If you don't care to give your phone number, address, or family income, leave the field blank. If the site won't accept your transaction, you can always provide information the marketers can't use. The EPIC site has some suggestions for creative and innocuous cloaking of your personal data.

Don't Know PGP from PPP?

MacUser maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically. Send mail to faq@macuser.com. *MacUser*'s address on the World Wide Web is http://www.zdnet.com/macuser/. You can reach me at traveler@macuser.com.

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HANDSon

Web browsers break down so often that using the Net can be more like treading water than surfing. Here's how to smooth out the trip.

By Ted Landau

When the Browser Breaks

BROWSERS AREN'T BAD, they're just so complex under the hood that you're likely to experience pages that inexplicably refuse to load, downloads that halt midstream, disconnects, freezes, and crashes. The problem is that even though browsers such as Netscape Navigator and Microsoft Internet Explorer are easy to use, their complexity can lead to problems. Use this guide to fixing Web-browser-related troubles to learn what can go wrong with your browser and how to keep your Web travels smooth.

Rudely Interrupted

If your browser freezes or your entire system crashes while you're exploring the Web, there are several possible causes. These interruptions may be related to a shortage of memory, or they may have to do with the way your browser stores information. In either case, you can adjust your software to put a stop to most of these interruptions.

The price for not giving browsers enough memory to satisfy their memory-hungry cravings is frequent disconnects, freezes, and system crashes. The primary solution if you have enough available RAM is to go to the browser's Get Info window and increase your browser's Preferred Memory size by several megabytes. Also, make sure your disk-cache size, which you set in the Memory control panel, is equal to at least 32K per MB of physical RAM in your Mac.

If you have plenty of memory allocated, it could be the particular way your browser stores files that causes crashes and freezes. When your browser reads a Web page, it typically creates a snapshot of that page and stores it as a cached file on your disk. It's not uncommon to have dozens or even hundreds of these cached files stored away. The benefit is that if you revisit a page, the browser can use the cache to load the page much faster than if it had to grab the data from the Internet each time. On the downside, this can cause problems because of the frequency with which these cached files are added and updated. Your browser writes to your disk often, increasing the chance of data corruption. You can tell if this is a problem by periodically running a disk-repair utility, such as Disk First Aid, and checking to see if there are numerous B-tree errors.

The short-term solution is to use a disk-repair utility to fix the disk. A longer-term solution is to take the extreme measure of not using caches at all; however, doing so causes your browser to slow significantly. To disable caching, go to the Cache dialog box in Navigator (Options: Network Preferences: Cache) or the Advanced Options dialog box in Explorer (Edit: Options: Advanced) and set the cache size to zero.

A better alternative is to create a place where your browser can store cached files without harming your hard disk. Unfortunately, some browsers, including Explorer 2.0, don't give you the option of choosing an alternate place to store cached files. You can do it in Navigator, though: First go to the Memory control panel and make a RAM disk. Then go to the Cache dialog box, click on the Browse button, and select the RAM disk for cache storage (see figure 1). The RAM-disk alternative does have one drawback: When you shut down your Mac, the system deletes the cached files.

An alternate method is to use a disk image instead of a RAM disk for storage. It's easy to create one by using the shareware program ShrinkWrap. Just choose "mount images unlocked by default" and "keep mounted images in RAM" in ShrinkWrap's preferences, and then store the resulting image file in the

ILLUSTRATION / RANDALL ENOS

Startup folder in your System Folder (so that you don't have to manually re-create the image file each time you fire up your Mac). If you use the ShrinkWrap method, you won't lose cached files upon shutdown, as you would with a RAM disk.

Memory Loss

Browsers are notorious for *memory leaks*, memory occupied by an application that isn't freed up when you quit the application. The easiest method for regaining the memory is to use a utility such as the freeware Mac OS Purge or *MacUser*'s RAM Handler. Such utilities won't always work, though, especially if you're using Open Transport 1.1. Until you get version 1.1.1, which helps prevent memory leaks with browsers, the only way to recover the lost memory is to restart your Mac.

To Err Is to Be a Browser

If you frequently get derailed by error messages while making your way on the Web, all too often the solution is out of your control. But there are instances when you can do something to thwart error messages. If "404 Not Found" errors are haunting you, you can try Netscape's recommended solution of making sure the browser's buffer size is bigger than 4K (go to Options: Network: Connections). This can help if the error message is the result of trying to connect to a server that's being overloaded with access requests.

If you suddenly start getting error messages on every page, it probably means you've lost your connection. Specifically, such messages as "Navigator was unable to create a network socket connection" or "Attempt to load <name of page> failed" mean you either aren't connected or you have a bad connection. If so, quit your browser, disconnect from the network, and start over. In extreme cases, you may also need to restart your Macintosh.

There are a couple of error messages that identify problems you simply can't do anything about other than wait for someone else to fix them. Two such messages are "Network connection refused by server" and "There was no response. Server could be down." The two most likely causes are that the page is being overloaded with more requests than it can handle or the server you're trying to connect to truly is down. Even if you do finally connect, an overloaded server can also cause agonizingly slow data-transfer times. Trying again later is the time-honored solution.

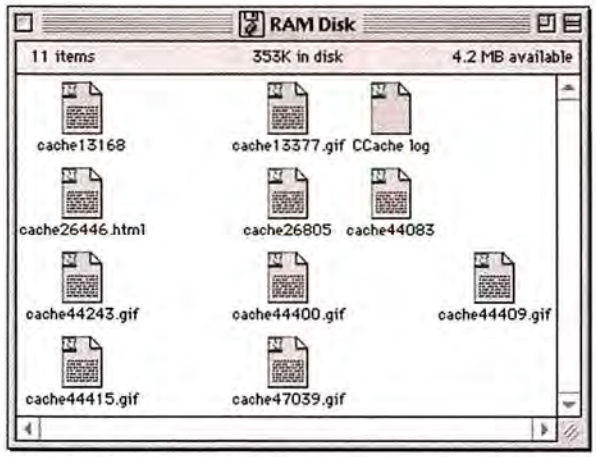

figure 1 / Disk corruption is all too common when you use Web browsers. One way to thwart this problem is to have your browser write cached files to a RAM disk. If the RAM disk gets corrupted, you can easily trash it and leave your hard disk untainted.

Unreadable Pages

If you open a page and it looks like it was designed by Picasso during his blue period, the most likely reason is that the page uses some aspect of HTML (HyperText Markup Language, the language used to create Web pages) that your browser doesn't support. In particular, Navigator has built-in support for several features of its own design (called Netscape extensions) that some other browsers don't recognize.

If the lack of extension support is the problem, you can switch to Navigator or Explorer, which supports most Netscape extensions. (Note: Explorer version 2.0 can't display frames. To best view pages that use frames, Microsoft recommends going to Edit: Options: Compatibility and selecting HTML 2.0 and Internet Explorer Features.)

Viewing a page correctly may also require optional plug-in files that don't come with your browser. For example, pages that feature animated images created by Macromedia's Shockwave technology require you to have the Shockwave plug-in in your browser's Plug-ins folder. *MacWEEK* maintains a list of dozens of the most popular plug-ins, at http://www.macweek.com/plugins.html. (See the "No Browser Is an Island" sidebar for other possible fixes to unreadable pages.)

End of the Storm?

The techniques in this article should help ensure smooth sailing on the Web. Hopefully, many of the problems we've described will disappear as Web browsers become more advanced. However, many of the troubles are complex enough that our solutions will probably last through more than the next software update.

Ted Landau, author of Sad Macs, Bombs, and Other Disasters, *has more Web-browser troubleshooting tips at his Web site (http://www.oakland.edu/~landau/sadmacs/).*

You can find the shareware and freeware programs referenced in this article at *MacUser*'s Software Central (http://www.zdnet.com/macuser/software/). You can also find them in the *MacUser* areas on CompuServe (GO ZMC:MACUSER) and America Online (keyword:MACUSER).

No Browser Is an Island / dealing with helper applications

A WEB PAGE FULL OF TEXT CHARACTERS that don't make any sense could be the result of your browser being unable to read the type of file you've accessed. Although your browser is equipped to read many types of files on the Web, such as HTML documents and GIF and JPEG graphics, there are a multitude of others it can't read. To read those other files, you need helper applications such as StuffIt Expander, for decoding and expanding BinHex-encoded files, and MoviePlayer, for QuickTime movies. These helper applications address problems that can give you a page full of unusable information. For those times, it pays to understand in more detail how your browser works with helper apps so you can make the right adjustments.

When a file is sent to a browser, the browser first checks for the MIME (Multipurpose Internet Mail Extensions) type of the file, usually identified by the filename's suffix. If all goes well, your browser identifies the MIME, matches the MIME to a helper application from a list it keeps in a helpers table, and then uses the helper app to open the file.

Problems occur when the server you're accessing fails to send the MIME with a file or sends a MIME your browser doesn't recognize. In such cases, the browser treats the file as though it has the default MIME, typically HTML. That's when you get a page full of HTML code rather than what you want to see. To fix this, you may need to add a new helper listing or edit an existing one. You can get to the helper table to make changes by going to Options: General Preferences: Helpers (in Navigator) or Edit: Options: Helpers (in Explorer). In some cases, changing the helper listing won't make any difference. This usually means that the problem is at the server end — for example, the server may incorrectly be listing a file's MIME. To solve this, contact the server's Webmaster for assistance.

By Bob LeVitus and Christopher Breen

Help Folder

Stop Balloon Helping me, keep your PowerBook on time, and keep your keyboard minty fresh.

Accidental Help

Q. I have trouble with programs freezing or displaying annoying help balloons after I accidentally press the Help key on my extended keyboard. Is there any way to disable this key?

Mr. Klink
via the Internet

CHRIS: Would we bother publishing your letter if there weren't? Believe me, our editor *hates* it when we submit a letter with the short response "Gee, I don't know."

BOB: I've solved this problem with CE Software's QuicKeys — the awesome macro utility I've touted so many times in these pages.

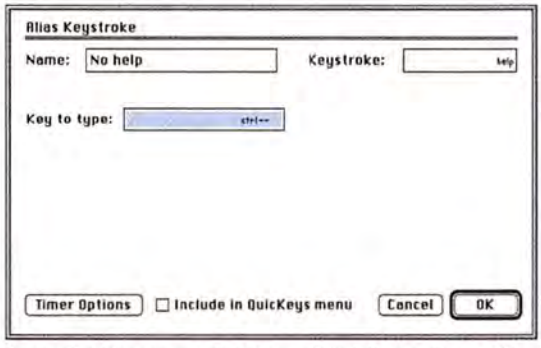

figure 1 / You can use CE Software's QuicKeys to "turn off" inconvenient keystrokes.

Open up QuicKeys, and define an Alias Keystroke. Then click in the Keystroke field, and press the Help key (see figure 1). In the Key to type field, press a key combination you're unlikely to stumble upon by accident, such as Control-hyphen. Name it something like No Help, and save. Now if you accidentally press Help, nothing happens. And if you suddenly get a hankering for some help from Apple Guide or while using a Microsoft product, pressing Control-hyphen or choosing the Help menu item will get you there.

CHRIS: Good choice, but if I were so bereft of funds that I had to choose between buying QuicKeys or a gift for my mother on her birthday (it's in late April, should you wish to send her a card), I'd take the free route: Download a copy of Paul Cunningham's CodeKeys 1.1.

The intent of this extension is to add functionality to standard Mac keyboards (key combinations for typing hexadecimal numbers, for example), but for our purposes, the most important aspect of CodeKeys is that it disables the Help key. No more Apple Guide or Microsoft Word Help springing to the fore when you've accidentally overshot the Delete key.

BOB: The price is right, but it can't run my e-mail sessions at 5:30 A.M. or any of the groovy macros I use. I'll stick with QuicKeys.

Future Shock

Q. My PowerBook had its date set to the year 2004 when I bought it. I didn't notice until after I'd loaded all my data, so now everything has a creation date eight years in the future. Is there some way I can reset all the creation dates without reloading everything from scratch?

T. David Burns
via the Internet

CHRIS: So much for the assertion that computers are superior to the human brain. On the contrary, T., your predicament proves just how utterly gullible and woolly-headed computers can be. If someone enters an erroneous date or time into the Mac's Date & Time control panel, does your li'l digi-buddy bother to check the newspaper, tune into the local news/talk-radio station, or stop a stranger on the street to inquire whether the millennium has clicked over lately? Heck no! This ignorant collection of chips and switches blithely nods its virtual head; chirrups "Yup, yup, yup! Whatever you say, boss!"; and slaps the wrong creation or modification date onto every file it sinks its teeth into.

Fortunately for us, because computers *are* so thick, it's mere child's play to trick them into changing the date to something more *au courant*.

We'll begin with Fix-It #1: The Simple and Expensive Way.

BOB: Open the Date & Time control panel, and enter the correct date. Now grab a copy of Symantec's Norton Utilities or MacTools Pro. Run either Norton Disk Doctor or MacTools' DiskFix, and wait for the error message to pop up indicating that some of your dates are out of whack . . .

CHRIS: Man, I used to have some dates who were seriously out of whack. Did I ever mention that female weight lifter I used to go out with?

BOB: *Ahem!* As I was saying, when the program prompts you to fix the dates, just click on OK and — presto! — your files should return to the here and now.

CHRIS: Fix-It #2: The Cheaper and Slightly-More-Complicated Way.

Download a copy of Richard Fiegle's $10 shareware application GetInfo Extreme. You

WRITE TO HELP FOLDER/TIPS

c/o MacUser
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Foster City, CA 94404

Don't want to wait for an answer? Post your question on the MacUser Forum on either America Online or CompuServe, or send e-mail to helpfolder@macuser.com or tips@macuser.com. We pay $25 to $100 for any undocumented tips we publish.

ILLUSTRATION / BOB STAAKE

can drag and drop a file, folder, or volume onto the GetInfo Extreme icon and batch-process any of a variety of file attributes — including file-creation and -modification dates. Much like Mr. Peabody's WayBack machine, GetInfo Extreme will transport your files forward into the past when you enter a new date and tell the program to do its stuff. Either method will take you far enough within the bounds of reality to stop the nagging of your backup and synchronization utilities.

BOB: Finally, make sure the time and date remain correct after the surgery. Check the Date & Time control panel, or turn on its menubar clock.

While we're on the subject of the correct time and date, here's how to synchronize your Mac's clock to Greenwich Mean Time — for the truly time-sensitive among you. Just download a copy of Jim Leitch's freeware utility Set Clock. It uses your modem to make a ten-second call to the NIST (National Institute of Standards and Technology) and then synchronizes your Mac's clock precisely with Greenwich Mean Time.

Use it a couple of times a year and your file dates will never go out of whack again, not even by a few seconds.

Key-ping It Clean

Q. Lately the power key on my keyboard won't respond unless I press it two or three times. I think the keyboard needs cleaning. What do you think?

Malcolm Reid
via the Internet

CHRIS: Yup, as I said to my wife when we passed that nightclub on our last trip to Seattle, "Sounds like grunge to me."

But seriously: Much like surgery, whenever you deal with cleaning components, you want to start with the least-invasive steps first. And then, if your efforts prove unsuccessful, you delve deeper into the guts.

BOB: My, what a colorful analogy. Following Chris' advice, don't disassemble the keyboard just yet: Pick up a can of compressed air — Radio Shack sells it under the name Dust Remover Spray — and try to blast the gunk away with a well-placed squirt or two between the key and casing.

CHRIS: If the patient doesn't respond, isolate and anesthetize it by unplugging the keyboard from the ADB port — do this *after* you've shut down the Mac.

BOB: I feel an obligatory warning coming on: *Never connect or disconnect your ADB devices without powering down first.*

We know you've heard this before, but ADB is particularly sensitive to static electricity. One little spark, and your ADB chip is history, often necessitating a costly motherboard replacement. Don't come crying to us with "I've done it a million times before and nothing bad happened" when yours fries.

Shut down first. Forewarned is forearmed.

CHRIS: Now back to the problem at hand. Flip the keyboard over, and start removing screws. Pull the keyboard from its casing, secure a can of nonconductive cleaning spray, aim the little red pipe you've attached to the nozzle between the key post and the switch, and give it a quick squirt. Bang out several taps on the key to free any loosened detritus, and give it another shot of the juice.

figure 2 / Using a key-cap puller is a kinder and gentler method than wrenching keys out of their sockets with your fingers.

BOB: Your cleaning will be more effective if you remove the cover of the key you're working on. Although you might be able to get an outside key off with your fingers, you're less likely to damage a key if you use a key-cap puller or a small screwdriver (see figure 2).

CHRIS: While you've got the keyboard apart, this might be an excellent opportunity to gently scrub away the crud that's probably caked atop the keys you use most often. A mild detergent and a foam swab work wonders in this regard.

If you choose to clean the case, make sure that all the keyboard's innards are completely dry before plugging the keyboard back in. This is important because a small amount of current travels down the ADB line; mixing juice (the electric kind) and juice (the liquid kind) is a formula for disaster — or at least for one dead keyboard.

Browsing the Web Versus E-Mail

Q. How do I get in touch with Ric Ford (the *MacWEEK* columnist), using AOL to reach him on the Web? His address is http://www.macintouch.com/. And how do I send him e-mail once I find him?

James Landsman
Pompano Beach, FL

BOB: Piece of cake, James, but let us clarify something first: http://www.macintouch.com/ is not Ric's e-mail address. It's the URL (that stands for Uniform Resource Locator) for Ric's MacInTouch home page.

CHRIS: It's just this easy: If you want to view the MacInTouch home page, log onto AOL as usual and then choose Switch to Browser from the Windows menu. When the Browser appears, you'll see AOL's Web page. There you'll find helpful info and plugs for AOL offerings. To move to MacInTouch, choose Open URL from the Services menu, type http://www.macintouch.com/, and then click on the OK button.

BOB: In a few seconds, you'll be gazing at one of the most informative Mac pages in existence. If you want to return to this page later (a good idea, since Ric updates it daily), you can save a couple of steps by starting your Web surf within AOL. While you're logged onto AOL, just type Command-K and enter a URL in the Keyword box. AOL will open the World Wide Web browser and steer it right to the page you want.

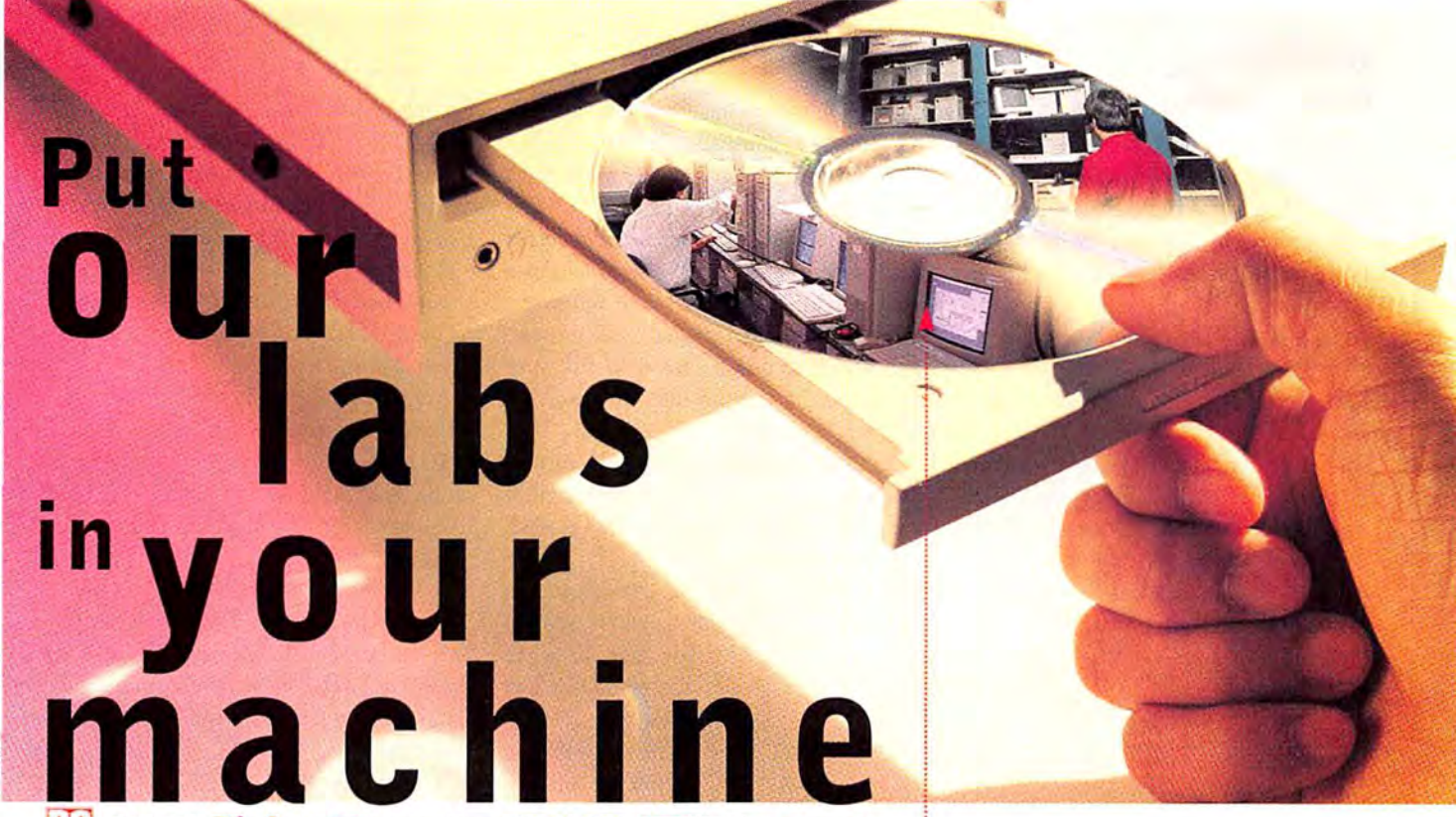
CHRIS: Ric's e-mail address (which, incidentally, we discovered by clicking on the Feedback button on his home page) is ricford@macintouch.com. You can send him a message from the Feedback link or via AOL's mail system.

BOB: It's easy to tell a Web URL from an e-mail address if you know what to look for. Web URLs always begin with *http://*, and e-mail addresses always have an @ symbol in the middle of them — for example:

Web URL: http://www.webpage.com/
e-mail address: john@company.com

One last thing: All this Web browsing requires version 2.6 or version 2.7 of AOL. We highly recommend 2.7 — a free download — because it's significantly more stable and reliable than 2.6.

PHOTOGRAPHY / TOM UPTON



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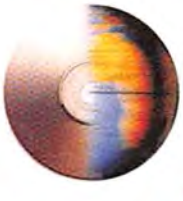

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Punctuated Filename

Q. Norton Disk Doctor always flags files whose names begin with a period and tells me that Apple recommends I avoid naming files in this way. What happens if I ignore Disk Doctor? Also, why can't you use a colon in a filename?

Steven N. Severinghaus
via the Internet

BOB: As usual, Norton is giving you good advice.

CHRIS: It's not good medicine to use a period as the first character in a filename for this reason: The Mac OS believes that any file that begins with a period is a *driver* — a small, invisible program that controls devices such as disk drives and serial ports.

BOB: Beginning any nondriver filename with a period may confuse your Mac, causing crashes, hard-disk corruption, or worse. Don't tempt fate . . . period.

CHRIS: As far as using a colon in the middle of a filename — the Mac OS uses colons as a kind of field separator. To wit: If you have a file called *stuff* stored in a folder called *important* on a hard disk named *hard disk*, your Mac refers to the file internally as *hard disk:important:stuff*.

To be technically and semantically correct, *hard disk:important:stuff* is the pathname of your file, and colons are always used as separators in pathnames.

BOB: If you're using System 7, you can't even put a colon in a filename — the OS won't let you. But for some odd reason, it *will* allow you to begin a filename with a period. As you now know, that's a bad idea.

One last thing: It's OK to use a period in a filename as long as it's not the very first character. In other words, *.garbage* is a bad filename but *bob.garbage* is just peachy.

Data Dump Truck

Q. I have just purchased a new Power Mac! Unfortunately, this blessed event has been blemished by my inability to figure out how to transfer the data on my old hard disk to the new one.

Paul Carty
via the Internet

BOB: We'll just assume that both old and new hard disks are internal, as the solution otherwise (if one or both of the hard disks were external) should be pretty obvious.

That said, here are a couple of data-moving options:

CHRIS: The first, and probably the easiest and least expensive, is to find an old serial cable (or heck, live a little and use a new one!), string it between the printer ports of the two Macs, and turn on System 7's built-in personal file sharing. Now, mount the old Mac's hard disk on the new Mac's desktop and copy your files from old disk to new.

Method 2 is a teensy bit more expensive and differs from the first only in that you use a pair of LocalTalk or PhoneNet connectors in place of the serial cable. But before you try either, hang on for a few little provisos, coming up in just a sec . . . .

BOB: This third method isn't as easy or inexpensive as the first two, but it'll work if you have an external storage device — a hard drive; a removable-media drive such as a Zip, Jaz, SyQuest, or Bernoulli drive; or a tape drive. If so, do this:

1. Connect the external device to your old Mac, and copy the files from your old hard disk to a volume on the device or use a backup program such as Dantz Development's DiskFit Pro to back up the entire hard disk. The backup software will probably make the copy more quickly than the Finder would.

2. Shut down the crusty old Mac.

3. Disconnect the device from Old Paint, and jack it into the new Mac.

4. Start up the new Mac, and then copy the files from the external disk to your new hard disk or use your backup software's Restore function.

Now for the provisos:

First, some programs will not take kindly to being moved from one hard disk to another. When you launch such an app after moving it, it will either ask you to type in your serial number again or (worse) make you reinstall the program from the master disks. All your copy-protected apps will need to be deinstalled and installed on the new disk — the copy-protection scheme doesn't transfer over.

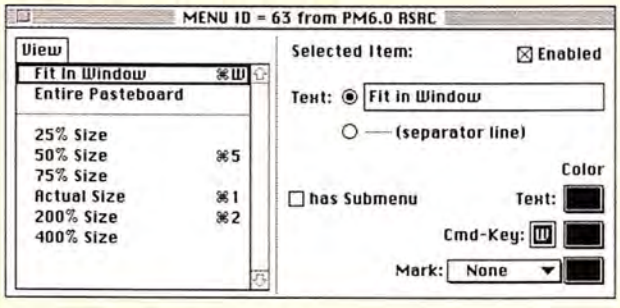
Of course, we know that all our readers own (and are able to locate) the original copies of all their software, and therefore entering a serial number or reinstalling protected applications will be nothing more than a minor inconvenience.

CHRIS: The second proviso is more important: Do not copy your old Mac's System Folder to the new hard disk. Besides the obvious problem of having two System Folders on the same disk, your old Mac's System Folder may well be inappropriate for your new machine. It's

Tips / PageMaker

Nostalgic Key Command

As a longtime PageMaker user, I wept piteously upon discovering that Adobe had succumbed to Apple convention and changed the Fit in Window keyboard command from Command-W to Command-0. After the appearance of too many Close dialog boxes, I decided to fight back with my trusty copy of ResEdit. To restore Command-W to its rightful position, perform the following ResEdit operation on a *copy* of your PM6.0 RSRC file:



Open the PM6.0 RSRC file with ResEdit.

Open the MENU resource.

Open the "File" resource (ID=2).

Open the Close menu-item resource and delete the *W* Command-key equivalent.

Open the View resource (ID=63).

Open the Fit in Window menu-item resource, delete the offending *0* (zero), and put *W* back in its rightful place.

Close the MENU resource.

Now for the scary stuff:

Open the MENT resource.

Open the "File menu enabling table" (ID=2).

Select everything in the resource (Command-A), and press Delete (or cut and paste the hex code to the Scrapbook if you think you might want to undo your work at a later date).

Close the MENT resource, and save the whole mess.

Now when you choose Command-W, PageMaker 6.0 will fit your document in the window.

Dennis Bishop
via the Internet

[If this technique sounds a little daunting, you can use Now Utilities' Now Menus to assign Command-W to the Fit in Window command. With Now Menus activated, simply click and hold on the Fit in Window command and press Command-W. Works like a charm, and it's safe as milk. — Ed.]

possible, and even likely, that your new Mac will not start up if you have the old System Folder loaded.

Your new Mac came with the appropriate System Folder preinstalled. We recommend that you use it. Although it may be a mild inconvenience to move control panels, extensions, or fonts, reinstalling them from the master disks ensures that all the pieces land in the right places. You may want to copy certain files (the Scrapbook or sounds) and folders (e-mail or fax) from your old System Folder to the new one.

BOB: Wait, one more thing . . . . If your old Mac is *really* old, you may want to check with the makers of your favorite software to see if PowerPC-native upgrades are available.

Switch Bitter

Q. I recently purchased an A/B switchbox so that I could connect additional serial devices to my Mac. Each of the serial devices works fine when connected directly to the Mac, but when I use the switchbox, the printer won't print. What's up?

Chris Gaffan
via the Internet

CHRIS: You haven't got your wires crossed.

BOB: Oh, *that's* enlightening. Care to elucidate?

CHRIS: What I mean is, some of the wires inside the serial cable cross to different pins at the other end of the cable. You know, inputs going to outputs?

BOB: Your printer is well aware of this cross-pin-ation, and if the signals it receives arrive on the wrong pin, the printer won't work. Thus Chris' obtuse statement that your wires aren't crossed.

CHRIS: And why not? Hang in there. The serial cable going from your Mac to the switchbox contains the proper crossed wires and presents the switchbox with a signal guaranteed to make even the most recalcitrant printer dance the buck-'n'-shuffle with glee. Ah, but here's the point at which the fly falls directly into the Neosporin: Inside the switchbox the wires don't get crossed.

BOB: Fortunately, there's a simple solution to your problem: Purchase a straight-through cable. These special cables pass the signal on as your Mac intended. Just string one of these babies between your serial port and the switchbox, and you're in clover.

CHRIS: One warning: Straight-through cables look exactly like standard mini-DIN-8 serial cables, so read the cable's package carefully. It should clearly state "straight-through."

This Just In

CHRIS: In our never ending quest to provide the latest info to our readers, here are a couple of updates to past columns. Bob?

BOB: In July (page 106), we wrote about Susan Townsend's six delicious VintageTypewriter fonts. She wrote to inform us that "there has been a change in the VintageTypewriter family: Instead of six fonts, there are now ten fonts, and I have changed the price from $20 to $35. People searching for the $20 font package on AOL may be disappointed to find the family now listed for $35, but I hope the four additional typewriter models will make up for the price increase. To be fair, I will still honor the six-fonts-for-$20 deal listed in *MacUser* and will let people pick whichever six they like best."

Thanks, Susan. We love all ten; our check is in the mail.

CHRIS: And in September (page 102), we stated that in order to replace the 14.4-kbps internal modem on the Performa 6200CD with a 28.8-kbps model, you'd have to wait for Global Village to begin selling faster internal modems. Just after we went to press with that issue, Global Village announced it would begin shipping the $240 (list) TelePort Platinum Comm Slot Edition. This 28.8-kbps modem card works with the Performa 5200 and 6200 models as well as with the Power Mac 5200/75 LC and 5300/100 LC.

An Extension Drag

BOB: In July, we gave somewhat inaccurate advice on dragging from Find File's Items Found window (page 110). We said it would work only if the Clipping Extension was in the Extensions folder. Actually, it's the *Finder Scripting Extension* you'll need. Ignore that egg on our faces.

Power On/Off Shortage

CHRIS: In August (page 120), we said that some Performa models included the Auto Power On/Off control panel. NOT! Apple, in its less than infinite wisdom, decided not to include that control panel on certain Performa models. Why? Apple claims that users who engage the telephony functions of these same Performas might unintentionally have their computers turn off automatically in the middle of receiving a call.

We regret to inform you that the only ways we know of for neglected Performa users to get Auto Power On/Off are

- From a sympathetic Apple dealer or friend.
- By calling Apple directly and begging.
- By going out and purchasing the retail version of System 7.5.

A Visual Difference

Q. I find it very tiring for my eyes to read black text on the white background of most Mac windows. Is there a simple way to add background color to a Mac window?

Quang Nguyen
via the Internet

BOB: Let's tackle the easy one first. In Microsoft Word (by the way, the Word 6.0.1a release is

Tips / Communications

Stop AOL

Are you stuck on AOL, watching the beach-ball cursor endlessly spin while the host is tied up? Command-period never seems to work, but here's a way to break away without performing a force-quit.

Press Command-Option-D. You'll see a dialog box that says "Creating Dumpfile." Clicking on OK interrupts the host and allows you to continue working. You'll find the dumpfile in your AOL folder, with a name such as *Dumpfile 9/27/96 2 34 52 PM.*

Max Kaganov
via the Internet

Warning: AOL Dumpfiles

While testing Max's tip, I thought I'd take a peek inside one of these dumpfiles to see what it contained. To my delight and horror, I discovered that within the data fork were my unencrypted screen name and password. Obviously, being able to track down your password is a boon if you've forgotten it, but leaving this kind of material around for prying eyes to discover isn't such a hot idea.

So why are we letting you in on this information if it's so potentially dangerous? Simple. Word gets out very quickly in this wired world. If we didn't tell you about this, someone else eventually would. And who knows, perhaps AOL will plug this particular leak (and allow Command-period to work as it should in AOL software!).

In the meantime: If you value the privacy of your password, do not allow others to use your account unattended. If you create any dumpfiles, destroy them immediately with a utility such as File Fire.

Christopher Breen
***MacUser* contributing editor**

New Netscape Navigator Trick

In the July '96 issue (page 108), someone mentioned that pressing Control-Option-F in Navigator transports you to the FishCam page. Another hidden key combination, Control-Option-W, whisks you to the White House home page.

Mariel Lohninger
via the Internet

noticeably faster than earlier versions of Word 6), choose Options from the Tools menu and click on the General tab. Then click on the Blue Background, White Text check box, and you're golden. Or at least white on blue.

CHRIS: There's a commercial product that does what you ask — adds background color to Mac windows — and although you'll have a lot of fun with it, it's probably not the solution you're looking for. Zonkers (Nova Development, 818-591-9600) lets you "personalize" your Mac by modifying its windows, scroll bars, buttons, cursors, icons, dialog boxes, desktop patterns, and more. Among the things you can personalize is the fill color for Finder and application windows.

Sounds great, but you can't personalize the color of *text* globally. You have to depend on your program's supporting white text. Although most civilized programs and even Microsoft Word let you select text color, the Finder and HyperCard don't.

BOB: This is a switch. For a change, it's me offering solutions that don't cost anything! Even though it's not *exactly* what you asked for, the CloseView control panel — free with System 7.5 — has a white-on-black video mode that reverses things so that white text appears on a black background in windows (see figure 3). CloseView's main purpose is to magnify the Mac screen, so if you're just looking for a reversed screen, turn magnification off.

CHRIS: If CloseView is not installed in your Control Panels folder, dig around in the Apple Extras folder or just fire up the System 7.5.x installer and perform a custom install.

Banish Pesky Windows

Q. I'd like the countless Read Me files I open to load faster, so it would be great if I could have SimpleText at startup without opening any documents and without opening a big empty window. Is there any way to do this?

Matthew Chalmers
via the Internet

BOB: Is there any way? IS THERE ANY WAY? Of course there is, Matthew. Why do you think we chose your question from the thousands upon thousands we received this month?

CHRIS: Not only is there a way, there are several of them, each more elegant than the one before! Here's how I did it . . .

Toss an alias of SimpleText into the Startup Items folder, and then open the handy-dandy AppleScript Script Editor and enter this script:

```
tell application "Finder"
  set visible of application
process "SimpleText" to false
end tell
```

Save the script as an application, name it zHide SimpleText, and fling it headlong into the Startup Items folder as well.

On restart, the script will launch after SimpleText, hide SimpleText's default Untitled document window, and switch to the next available application — the Finder if that's the only other thing you have running on startup.

Technically you *have* opened a big empty window, but with the Hide command you've just created in place, you won't see it. It will appear when you switch back to SimpleText, of course, but at least it's not the first thing plastered across your Mac when you start up.

BOB: Here's a way for QuicKeys users to accomplish the same thing. Create a Close Window shortcut, and turn it into a stand-alone application by choosing Make Icon from the QuicKeys File menu. Move the Close Window icon to the Startup Items folder and then rename it SimpleText aliasZ so it loads right after SimpleText.

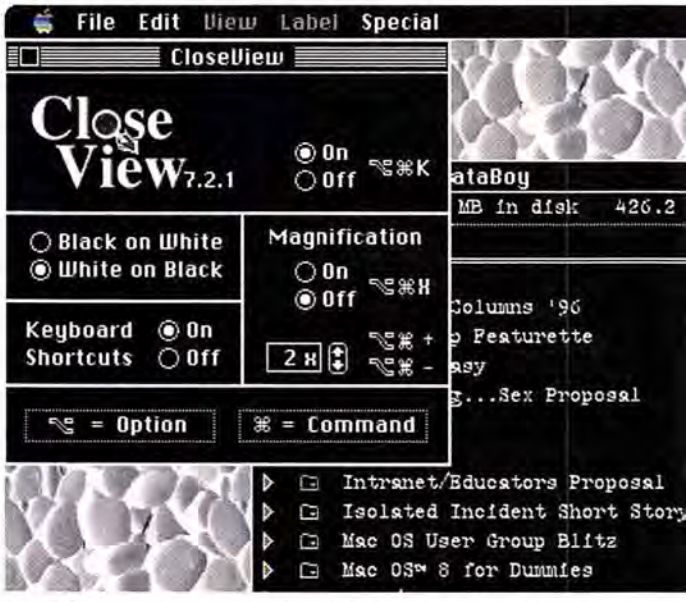


figure 3 / CloseView reverses black and white on your Mac's screen and can magnify the screen too.

CHRIS: If SimpleText were scriptable this would all be moot — you'd just write a Close Window AppleScript script, and you'd be done.

BOB: Don't whine. You get what you pay for. There is one other way, it costs only $10, and it's my favorite of the three. Get a copy of Tom Bender's fabulous shareware program Tex-Edit Plus. One of its preferences is a choice of what happens after you launch it: blank document, Open dialog box, or nothing. Pop an alias to Tex-Edit Plus in your Startup Items folder, get rid of all your old copies of the inferior SimpleText, and let Macintosh Easy Open redirect SimpleText documents to be opened by Tex-Edit Plus. This is my recommended solution.

There are a million more reasons why you should get Tex-Edit Plus. For a mere $10, you get a multiwindow, styled text editor that is ten million times better than SimpleText. Here are just a few things it can do that SimpleText can't:

- Create, edit, and print styled text documents of any size (limited only by RAM).
- Easily create TeachText/SimpleText read-only documents that include embedded pictures.
- View, edit, and print text documents created by virtually any word-processing program or computer.
- Reformat downloaded e-mail or text, correcting word-wrap problems and removing extraneous, non-Mac characters.
- Quickly optimize a document for printing, replacing generic, typewriter-era characters

Tips / Graphics

It's a Drag

I've stumbled upon a simple method for creating desktop icons out of my Illustrator 6.0 files. Those who have worked with this program know that if you cut a bit of artwork and paste it into the Scrapbook, a generic PostScript logo appears both in the Scrapbook and as the icon when it's pasted into a file's Get Info box. But thanks to Illustrator 6.0's new Macintosh Drag and Drop support, pasting icons is as easy as pie.

Create the design, select the portion you want to use, and drag the image off the page to the desktop. As is the case with other Drag and Drop graphics-aware applications, a picture clipping will be created. Unlike the paste-to-Scrapbook method, which converts the picture to EPS (AIBC) format, dragging and dropping converts the illustration to a PICT file, which can easily be used as an icon. Just copy the clipping, open the Get Info box of the file you want to change, click on the original icon, and paste.

P. Michael Hartman
Franklin, PA

with professional-looking typographically correct text, *or* strip smart quotes for e-mail.

- Create simple hypertext documents.
- Insert attention-getting sound annotations to spice up ordinary interoffice mail.

Tex-Edit Plus is definitely shareware worth paying for.

External Disk Doesn't Mount

Q. I have internal and external hard drives connected to my Mac, and I like to switch between drives and OS versions at will. When I choose the internal hard disk in the Startup Disk control panel and restart, the external disk doesn't mount. If I restart again, the external disk mounts just fine. After a shutdown, the same thing happens — the external disk doesn't mount the first time I start up my Mac. If, on the other hand, I boot from the external disk, the internal disk mounts properly.

Help!

John Watson
via the Internet

BOB: The same thing recently happened to me, and it was driving me nuts. Tom Beardmore, a tech wizard at APS Technologies, figured it out for me. It turns out that because my Mac and my drives are connected to a PowerKey Pro (kind of like a really smart power strip), my Mac and all of my peripherals are turned on simultaneously when I boot the machine. When all this equipment starts at one time, the external disk is not "ready," or "spun up," at boot time, preventing the disk from mounting as it should.

Of course, as you've come to expect from this column, you know there are at least two ways in which you can make the external disk ready.

CHRIS: The first way is so simple that you'll wonder why you didn't think of it yourself. Turn on the external drive at least 30 seconds before you turn on your Mac. That will almost certainly do the trick.

BOB: But the better and easier way to guarantee that your external disk will mount each and every time, even if it was not spun up when you switched on your Mac, is to install the terrific freeware control panel SCSIProbe. Turn the Mount Volumes During Startup preference on, and your disks will spring to life at startup.

As an added bonus, you can use SCSIProbe to mount almost any kind of removable media — Zip, SyQuest, Jaz, optical — at any time, even if there was nothing in the drive when you started up your Mac.

Tips / System Enhancements

More Note Pads

Apple's Note Pad is convenient, but it's limited if you want to keep grouped sets of notes on multiple pads. Here's a way to create as many Note Pads as you want.

Make a copy of the Note Pad application, found in the Apple Menu Items folder. Open that copy with ResEdit, and open ID 1000 of the STR# resource. Scroll down to the fifth string (it reads Note Pad File), and enter a new name — Note Pad 2, for example. Save your changes, and quit ResEdit.

Open the System Folder, and make a copy of Note Pad File. Give the copy the same name you entered in the string resource (Note Pad 2). You now have two discrete Note Pads with their own unique entries.

Travis Simcox
via the Internet

Preemptive Extension Manager

One nice feature of Casady & Greene's Conflict Catcher 3 is that you can manage extensions that load before Conflict Catcher does. Apple's Extension Manager doesn't provide this service. However, using this little trick, you can get Extension Manager to load before such extensions as Now Toolbox and SpeedDoubler's Speed Access and Speed Emulator — thereby giving you the opportunity to turn them off.

Simply use a file-type editor such as ResEdit, FileTyper, or Snitch to change the EM Extension's file type to scri. Extension Manager will now load before everything except RAM Doubler.

Vicchea Ly
via AOL

Find File a Drag

Occasionally, it's useful to know the file type and creator of a file. But who needs special utilities? Just open Apple's Find File, click on More Choices, and select the File Type and Creator fields. Return to the Finder, and drag and drop a file into Find File's main window. Magically, Find File shows the characteristics of the file.

Drag-and-drop is handy for more than reading these two fields. Suppose you want to find all of your word-processing documents that are larger than a megabyte. Bring up Find File; display the File Type, Creator, and Size fields; drop an example document onto the Find File window; type 1,000 into the Size field; and click on Find. Up pops the list you were after.

Stephen Holland
via the Internet

Bugged by MacsBug

Q. I recently downloaded MacsBug, but I don't know how to install it. When I click on its icon, I learn that the application that created it cannot be found.

David Luna
via AOL

BOB: Ah, the venerable MacsBug. The most feared — and occasionally useful — Apple bugger this side of ResEdit.

CHRIS: That's *de*bugger. And watch it. Rhoda, our British-expatriot associate technical editor, isn't comfortable with that word.

BOB: Right. As Chris says, MacsBug is Apple's debugger, and it has been around for just about as long as I can remember.

CHRIS: And Bob can remember a *long* time. To install, simply drag the MacsBug icon to your System Folder and restart. You will know it's on the job when you see the admonition "Debugger installed" on the Welcome to Macintosh screen.

BOB: Although MacsBug is meant for programmers who understand the internal workings of Mac code, mere mortals can get some use from it as well.

CHRIS: For example, typing ES (translation: *Escape Shell*) when your Mac crashes and spits you into the MacsBug window can sometimes pull you from the depths of hosedom and place you back in the Finder (where you should immediately save any and all work that you can and restart your now unstable machine).

BOB: RS (*Restart*) is another useful command — particularly when your Mac is so confused that the ES command does nothing more than briefly take you to the Finder and then right back to MacsBug.

CHRIS: Finally, typing SC (for *Stack Crawl*) shows you just which command your Mac tripped over. It's all fascinating stuff if you are the sort of person to be entertained by such minutia.

If you'd like to test your skill with these commands — and, more important, succumb to the geekish thrill those early DOS adopters must have experienced — first install MacsBug as described above, and then press the Command and power key or the hardware programmer's switch. *Whoosh!* Welcome to Codesville!

Bob LeVitus is the author of 20 computer books and is a columnist for the Houston Chronicle. *Christopher Breen recently coauthored* The Macintosh Bible Guide to Games, *published by Peachpit Press.*

You can find the shareware and freeware programs that are referenced in this article at *MacUser's* Software Central (http://www.zdnet.com/macuser/software/). You can also find them in the *MacUser* areas on CompuServe (GO ZMC:MACUSER) and America Online (keyword MACUSER).

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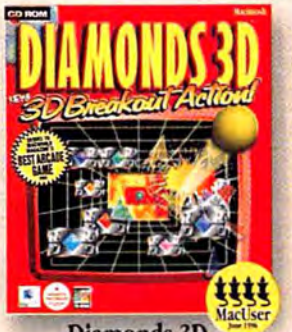

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Breakout in three dimensions! Inside Mac Games calls it "Fun and addictive. The best breakout-style game we've played." The ball doesn't bounce up and down, it comes right at you!

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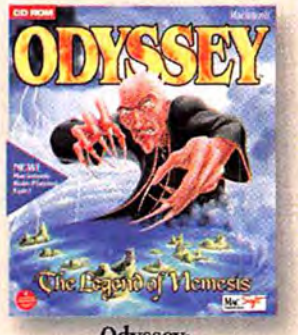

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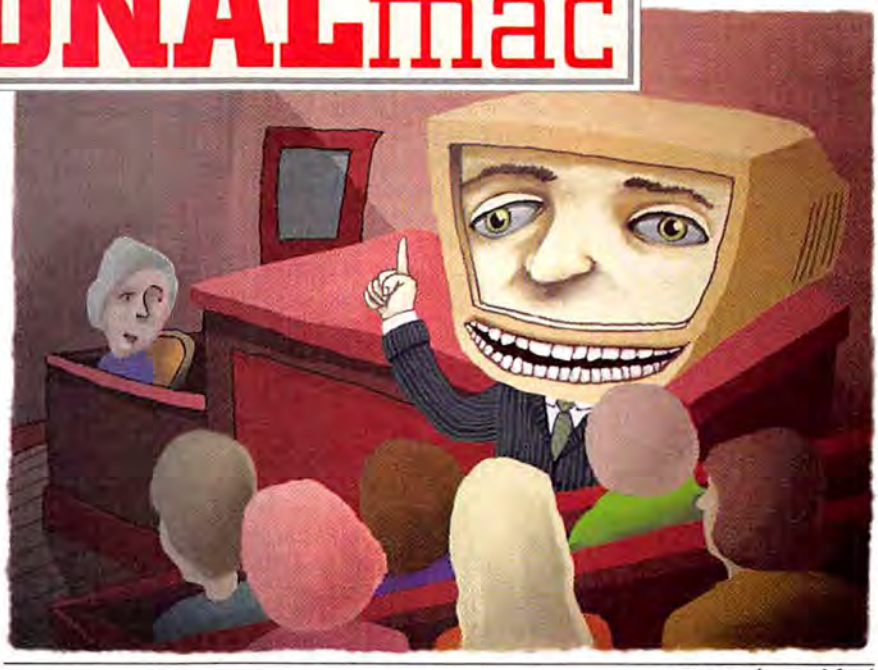

Let your Mac make the legal system a little more user-friendly.

By Carolyn Bickford

The Virtual Lawyer

OUR CONVOLUTED LEGAL SYSTEM gives us laws written in an obscure dialect of Latin called legalese and subjects us to the mood swings of overworked court clerks. And since attorneys have a heavy hand in government, it's not surprising that we still settle our estates through an archaic process called probate, during which lawyers, accountants, and the probate court inherit some of what we owned. To make sure you don't get the short end of the legal stick (and to keep lawyers' bills to a minimum), let your Mac take the stand.

Where There's a Will

You don't have to be Howard Hughes to cause an uproar if you die without a will. If you die intestate, a judge decides who inherits your possessions according to your state's laws. That's fine if you have only one apparent heir, but you may accumulate a lot of bad karma if the guitar you promised to your best friend ends up being sold to pay your debts at an estate auction.

When it comes to making a will, the next best thing to a lawyer is **WillMaker 6** (★★★★; $69.95 list), from Nolo Press (800-922-6656 or 510-549-1976; http://www.nolo.com/). It gives thorough instruction, ranging from whether you should create a will at all to how to avoid probate taxes and fees. It helps you make a will in just a few minutes, leading you through a series of steps with clearly phrased prompts. If any step isn't clear, you can access the online help or refer to WillMaker's thick manual packed with tips.

You can also write a will with **Quicken Family Lawyer** (★★½; $49 list), from Parsons Technology (800-223-6925 or 319-395-9626; http://www.parsonstech.com/), although it's a lot less friendly. Like WillMaker, Quicken Family Lawyer leads you through a series of steps with on-screen prompts, but the language in both the program and the will you create is unnecessarily formal. You'll get no help from a manual, because there isn't one, although you can watch videos of a lawyer answering frequently asked questions. Stuffy as he may be, at least you don't have to pay him over $100 an hour.

Quicken Family Lawyer isn't restricted to helping you with your will; it also has a dozen other forms, including power of attorney. We would recommend this product if the forms were more helpful. Unfortunately, many of them are simply fill-in-the-blank form letters that are inappropriate in many cases or are so incomplete they're not much help. The Exhibit form, for instance, is nothing more than a page with a title and a blank field into which you have to type every detail yourself.

Wills on the Web

Is it any wonder that in this age of the Internet you can prepare your will online? At **Lawgix** (http://www.lawgix.com/), your job is to fill out a form in which you specify your beneficiaries and endowments, name guardians for your children, and set up property management for beneficiaries not yet able to accept an inheritance. Lawgix will then send you your will ready to be witnessed and signed. You don't have as much flexibility with a Lawgix will as you do with one created by WillMaker or Quicken Family Lawyer — for instance, you can't intentionally disinherit someone — and at $60, it's no bargain compared to WillMaker or Quicken Family Lawyer. The one thing you do get with Lawgix that the others don't provide is access to a live, human lawyer. The Lawgix

ILLUSTRATION / DAVID RICCERI

lawyer not only checks over your will to spot potential problems but is also available to answer questions over the phone. Besides, there's a certain cachet to putting together your last will and testament over the Net.

Living Wills and Trusts

WillMaker and Quicken Family Lawyer can also help you create a living will. This critical document specifies your wishes regarding such important issues as whether or not your health-care provider should use artificial means to keep you alive. You can also use it to make arrangements for donating your organs.

If your estate is large enough that a sizable chunk of it is in danger of being eaten up by your state's probate and estate taxes, your estate planning should include making a living trust. **Nolo's Living Trust Maker 2.0** (★★★★; $79.95 list) is just as user-friendly and has the same kind of thorough manual as WillMaker. As you would expect, it produces a legally valid living trust. But you still have to go through the process of actually placing your property into the trust (which requires many of the same steps as selling property). You may end up requiring some legal help anyway, but Living Trust Maker gives you a solid beginning without charging extra for making corrections.

Digital Defense

It may seem as if laws are set in stone, but as any good lawyer will tell you, it's strategy that can make the difference in court. ▲ **Be Prepared! for Your Deposition** (★★★★; $199 list), from CLE Group (800-373-1829 or 415-324-1827; http://www.clegroup.com/), is a CD-ROM that not only explains the laws governing depositions but also, more importantly, gives you strategic tips for answering questions during a deposition. One of the best parts of the program is its relaxed, friendly video attorneys, who tell you what the law books won't. For instance, one of the attorneys confides that he pretends to get angry in order to fluster the person giving the deposition. You see helpful video examples, such as a nervous witness stumbling through a deposition, combined with information on what she should and should not have done. Also useful is the interactive test that lets you find out what you've learned — or haven't learned. At $199, Be Prepared! is expensive and is intended for an attorney to share with clients. But for $39.99, you can get a version that allows you to launch the program three times.

You can also get help finding legal advice from Nolo Press' book *Law on the Net* ($39.95 list). It includes a CD-ROM with links to legal sites, although most of the sites are about as thrilling as municipal-court-library files. One exception is the entertainingly eclectic 'Lectric Law Library (http://www.lectlaw.com/). Here you'll find information about domain-name disputes, a home-financing primer, and liberal ACLU opinion pieces side by side with priceless right-wing missives such as "Absolute Proof the Clintons are Communist Lackeys."

Closing Argument

The software and services available to you through your Mac can help you create documents that require only witness signatures to be legal and binding. However, because life can get complicated — just being married or owning property can make creating legal forms tricky — you may need to enlist the help of a lawyer. That shouldn't stop you from doing much of the work yourself. You can always create your own documents and then have a lawyer sympathetic to do-it-yourselfers help you finish.

MacUser Associate Editor Carolyn Bickford was kicked out of the 'Lectric Law Library for asking how she could get rich by suing God.

The Two Dads

BY RIK MYSLEWSKI AND JIM SHATZ-AKIN

JIM: Have you ever noticed that most things touted as "fun for the whole family" aren't?

RIK: You're too cynical. How about a day at the ball park?

JIM: How about a day at a kid-crammed water slide? Or, for Walt's sake, two hours of Disney's *Happy, Hunky Hunchback of Notre Dame?*

RIK: You've got to admit, however, that there is an occasional *Babe* in the woods.

JIM: Rarely. Take, for example, LucasArts' ◀ **Mortimer and the Riddles of the Medallion.** Although the box bills it as being for "Kids to Adults," no one old enough to have a driver's license would get a kick out of target shooting while flying a giant wise-cracking snail.

RIK: I did.

JIM: But only because Mortimer's flying model is taken straight from the LucasArts *Star Wars* shoot-'em-up stuff that you and your kids enjoy so much.

RIK: Maybe so. But there *are* a few kids' titles that grown-ups can enjoy. Check out Edmark's **Strategy Games of the World,** for example. Although its coaching feature is clearly designed for kids, anybody can enjoy playing Go-Moku, Mancala, and Nine Men's Morris.

JIM: Come to think of it, I did find myself guiltily enjoying **Logical Journey of the Zoombinis** ▶, a great problem-solving game from Brøderbund.

RIK: Hey, why the guilt? It's fun!

JIM: Well, maybe I'd feel less chagrined if I were a bit better at it.

RIK: If you *really* want to feel like your kids are smarter than you, try Sunburst Communications' **The Factory,** a simple-but-challenging pattern-recognition game designed for the classroom.

JIM: It's a one-trick pony — but a good one.

The Factory ★★★½

Ages: 9 – 14.
Price: $59.95 list (CD-ROM). Quantity pricing for schools is substantially lower.
It may look easy, but using the simple tools in this animated factory to create the desired patterns is a real challenge — and a fun one.
Company: Sunburst Communications, Pleasantville, NY; 800-321-7511 or 914-747-3310; http://www.nysunburst.com/.
Reader Service: Circle #419.

Logical Journey of the Zoombinis ★★★★

Ages: 8 – 12.
Price: $39.95 list (CD-ROM).
There are hours of playtime in this complex but engaging math and logic game, as you help a bevy of adorable Zoombinis find their way to a new home.
Company: Brøderbund Software, Novato, CA; 800-521-6263 or 415-382-4740; http://www.broderbund.com/.
Reader Service: Circle #420.

Mortimer and the Riddles of the Medallion ★★★

Ages: 6 and up.
Price: $39.95 list (CD-ROM).
A rare Two Dads disagreement: Rik likes the fast-paced arcade-style game play, but Jim thinks its ecological educational content is meager and its fly-through game frustratingly clumsy.
Company: LucasArts Entertainment, San Rafael, CA; 800-985-8227 or 415-472-3400; http://www.lucasarts.com/.
Reader Service: Circle #421.

Strategy Games of the World ★★★★

Ages: 8 – 14.
Price: $39.95 list (CD-ROM).
Play three classic games at three levels of difficulty, with help from an animated coach's suggestions and QuickTime clips of real-life lessons in strategic thinking.
Company: Edmark, Redmond, WA; 800-691-2985 or 206-556-8484; http://www.edmark.com/.
Reader Service: Circle #422.

Until now, the on-ramps to the Internet have been under construction.

Introducing the Apple Internet Connection Kit.

Getting hooked up to the Internet can be a messy process. That is unless you've got exactly the right tools. Presenting the Apple® Internet Connection Kit. It's everything you need to get on and get around the Internet quickly, easily and with a minimum of frustration. Here's what you receive: Netscape Navigator™, Claris Emailer™ Lite, Progressive Networks RealAudio, NewsWatcher, Fetch, the Apple Internet Dialer, Quicktime® VR Player and more. Plus, if you come across anything you don't understand, Apple Guide on-line help is there to assist you right away.

Just think, 30 minutes after opening the box, you could be participating in discussion groups, E-mailing Aunt Helga in Denmark, visiting the Louvre, the Library of Congress or maybe even the local chicken joint. (Seems like everybody's got a Web site nowadays.)

Visit your Apple reseller, or order direct by calling **1-800-950-5382 ext. 784.** And when you do get on the Net, check out our Web site at http://www.apple.com.

Apple. The power to be your best.

CLARIS Em@iler

NETSCAPE

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The Game Room

BY ROMAN LOYOLA

IF YOU NEED TO ESCAPE the world you're living in, there's an alternative reality waiting for you in your computer. For this month's special expanded Game Room, I've looked at five titles that let you experience vastly different lifestyles: those of a cockroach, a demiurge, a star-fighter pilot, a giant armored robot jockey, and a hardheaded caveman. And, just when you thought things couldn't get any better, I've added a sneak preview of what looks to be one of this year's hottest new Mac games: Warcraft II.

Bad Mojo

The Kafkaesque Bad Mojo has two striking features: a story idea not yet tapped in Mac gaming and extraordinary graphics. In Bad Mojo, you are metamorphosed into a cockroach and journey through a filthy apartment building until you turn back into a human. Besides having a fresh story idea, Bad Mojo is also innovative in that it gives you more than one story ending — depending on the choices you make during the game, you finish with one of four different conclusions.

To describe the look of the game, I'll paraphrase a fellow *MacUser* editor: If you were fascinated by boogers as a kid, you'll appreciate Bad Mojo. There are dead rats, bugs, dying fish, and a urinal you'd want to flush only by using a boot-clad foot — all created with the finest of detail. The graphics convey a dingy atmosphere that would give Felix Unger a nervous breakdown.

As for the game play . . . it would be nice if someone could develop a *new* concept for adventure games. Unfortunately, Bad Mojo falls into one of the typical molds: a journey in which you use various objects in a game to solve one problem after another. The problems may look a little different in Bad Mojo — your clues come from other vermin, and your challenges are along the lines of rescuing a baby cockroach surrounded by grease spills on a stove — but underneath that greasy veneer is the same old trial-and-error puzzle solving. If it hadn't been for the amazing graphics, I probably wouldn't have finished the game.

Afterlife

Know anyone with a serious God complex? Maybe you? Then Afterlife, from LucasArts, is the game you're looking for. As in Maxis' SimCity 2000, your job is to create a thriving community. The twist in Afterlife is that you're a demiurge in control of heaven and hell for a "planet far, far away."

The subject matter of Afterlife could make great fodder for a sim parody, but this game keeps you too busy thinking to have time to laugh. That's because you must monitor more elements than in most sim games. You have to keep track of zones, the number of souls coming and going, the types of souls (be they avaricious sinners or diligent saints, to mention two of many types), the needs of the souls, and the structures they use. On top of that, you have to keep track of all these elements on two separate planes: heaven and hell. And each plane requires a different strategy — for instance, hell must be inconvenient for its inhabitants.

Gamers new to the sim genre are likely to be overwhelmed. However, Afterlife should satisfy sim nuts who have been waiting for the next challenge.

Even for experienced sim users, Afterlife has its flaws. Using charts and graphs is a cumbersome way to keep track of your little piece of heaven and hell. Also, there are some unnecessary obstructions to seeing what's going on in your world: Scrolling is choppy, and important elements, such as buildings, are sometimes eclipsed from view.

Wing Commander IV: The Price of Freedom

So what exactly is the price of freedom? Well, according to Origin, about $12 million. Yup, that's right; that's how much Origin spent creating the latest installment in the popular Wing Commander series. Mark Hamill, Malcolm McDowell, and the guy who played Biff in the *Back to the Future* movies are all in this six-CD-ROM set.

Wing Commander IV (WC IV) is a combination interactive movie and flight simulator. The movie part of WC IV can't compete with Hollywood's best box-office hits, or even the worst, but it's better than most interactive movies on CD-ROM. For an interactive movie, the plot is well developed. And it can take one of two courses, depending on which side of a battle you choose to fight: You can either help create a civil war in an alien universe, or you can help prevent the uprising.

Another nice touch is that the story line changes according to your demeanor. For instance, how you treat another character determines how that character reacts when you need help. WC IV's attractive sets and engaging personalities also add quality to the movie. One notable flaw, however, is that some of those engaging personalities appear and then disappear, never to be heard from again.

The flight sim provides lots of shoot-'em-up action, and there are plenty of missions. But I can't seem to gauge the difficulty scale. In Rookie level, I was untouchable, but in the next level up — Veteran — I was getting spanked hard. I'll spare you the details of the beating waiting for you in the highest level, Nightmare.

Don't bother playing WC IV without a joystick. I tried to fly by using the keyboard, and I was shot down faster than a Cylon in *Battlestar Galactica*.

MechWarrior 2

MechWarrior 2 is a battle simulator in which you man the cockpit of 100 tons of mechanized destruction (see figure, upper right). Remember the robot walkers in the movie *Return of the Jedi?* Well, BattleMechs are like those walkers, except they're bigger and meaner and would easily crush an Ewok into paste (yum!).

You are a member of one of two clans that are battling in the feudalistic 31st century. When you join a clan, you have 12 missions to complete. A background database, some limited online help, a 20-page pamphlet, and a quick-reference card are the only included documentation to explain how you might complete those missions — woefully inadequate for a simulator of MechWarrior's complexity. I highly recommend getting a copy of the $20 *Official MechWarrior 2 Battle Guide* (Brady Publishing), unless having the snot pounded out of you because you don't know which button to push is your idea of fun.

Once inside the mission area, you can go straight to a mission briefing or to the BattleMech Lab. The 15 BattleMech designs range from the lightly armed but lightning-fast Kitfox to the dreadnought-on-legs Dire Wolf. In the lab, you can customize every variable: the selection of weapons, where they're mounted on your Mech, how armor

is allocated, even the number of heat sinks used to keep all that hardware from melting into slag.

MechWarrior 2 makes no pretense of being an interactive movie: There are no movie-style transitions between scenes. In fact, with the exception of the disjointed, text-only briefings, the game has nothing to give a sense of place — except the battlefield itself.

It is on the battlefield that MechWarrior truly shines. Each mission takes place on a different landscape. And, although MechWarrior's 3-D imaging is basic, it compensates with fast, fluid rendering. It even offers limited stereo motion sound effects.

There are so many variables under the player's control that no one could ever manage them all. Temperature; altitude; turret position; standard, infrared, or enhanced visuals; radar and satellite tracking; missile, energy, and slug-throwing weapons with variable projectile and recharge speeds and effective ranges — the list goes on.

Sometimes so much complexity makes a game unwieldy. But in MechWarrior, complexity only adds to an incredibly rich game reality.

Grag & Thog Bonkheads

This game took me back a ways, to my junior-high-school years, when the local video-game hangout was Robinson's Hick'ry Pit. One of the most popular games at the Pit was Mario Bros.

Bonkheads is Mario Bros. reborn. Grag & Thog take the place of Mario and Luigi, in an underground world instead of in plumbing pipes, but the game play is basically the same: Clear the screen of the creepy crawlers by running underneath the platform they are on, jumping, and hitting the ceiling. This action knocks a creature on its back, giving you a few seconds to jump up to its level and kick the critter off the screen.

It's a simple premise but challenging enough to get me to spend my lunch money on Mario Bros. Fortunately, I have to spend only $25 on Bonkheads.

In fairness, Bonkheads isn't simply Mario Bros. in a new setting. There are new challenges: web platforms that fall apart if you jump under them, wall climbing, and bosses you must conquer in order to proceed to the next series of levels. The graphics are nicely done, and the controls are simple: up, down, left, right, and jump.

For some, Bonkheads might be too simplistic — if games were like books, it would be *The Cat in the Hat*, whereas MechWarrior 2 is more like *Finnegan's Wake*. But *The Cat in the Hat* went on to become a classic; Bonkheads might not become a classic, but it sure is entertaining.

Roman Loyola is a MacUser *associate editor who uses The Game Room to escape from editing stories about RAID Level 0, Fast Ethernet, and scanners. Game Room foil Andrew Gore also contributed to this report.*

GAME POINT

Bad Mojo is worth playing for the high-quality graphics alone, even though you'll find the same old style of puzzle solving that's in just about every adventure game. Afterlife is made for sim experts who need a new challenge, but its complexity can be frustrating. Wing Commander IV is a must-have for fans of the series, although it isn't as good as Wing Commander III. MechWarrior 2 will satisfy any battle-simulator aficionado, with its intense action, but it fails to get you involved in its story line. And Grag & Thog Bonkheads is great for gamers looking for arcade fun, but others may find it a little too simpleminded.

Bad Mojo ♦♦♦½

Price: $50 (estimated street).
Company: Pulse Entertainment, Santa Monica, CA; 800-264-0325 or 310-264-5579.
Reader Service: Circle #423.

Afterlife ♦♦½

Price: $55 (estimated street).
Company: LucasArts Entertainment, San Rafael, CA; 800-985-8227 or 415-472-3400.
Reader Service: Circle #424.

Wing Commander IV: The Price of Freedom ♦♦♦

Price: $55 (estimated street).
Company: Origin Systems, Austin, TX; 800-245-4525 or 415-571-7171.
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MechWarrior 2 ♦♦♦½

Price: $44.95 (estimated street).
Company: Activision, Los Angeles, CA; 800-477-3650 or 310-473-9200.
Reader Service: Circle #426.

Grag & Thog Bonkheads ♦♦♦

Price: $24.95 (estimated street).
Company: 1 AM Productions, Tacoma, WA; 888-588-6165.
Reader Service: Circle #427.

Warcraft II (not rated)

Price: $54.95 (estimated street).
Company: Blizzard Entertainment, Torrance, CA; 800-953-7669 or 310-793-0600.
Reader Service: Circle #428.

First Look: Warcraft II

The popular real-time strategy game Warcraft II is coming soon to the Mac (if it's not already available by the time you read this). For several weeks, players have been able to whet their appetites with a Warcraft II demo that's freely downloadable from the Net. But because we were able to get our hands on a beta version of the game, we got to explore beyond the handful of basic levels available in the demo. What we found is a truly rich game that will satisfy fans of the first Warcraft game as well as attract new players.

The game continues the war between humans and Orcs that began in the original. The 28 new scenarios take you from the cold of winter to the deep blue sea. What makes Warcraft II a really cool game are the new characters, engines of war, and structures. Your army now includes Death Knights, Dwarven Demolition Squads, and even dragons. You can build guard towers, aviaries, and shipyards. Sea battles require you to build tankers, transports, and destroyers. You can construct Gnomish Flying Machines and Goblin Zeppelins to scout the surrounding areas. And besides mining gold and chopping down trees, you also need to refine oil from sea-bound oil rigs.

The new sounds add more flavor to the game: Country peasants sound like big, lovable galoots, and knights speak boldly and obediently, as you'd expect (if you miss the grumpy responses, try continuously clicking on a character — it really irritates 'em).

Blizzard Entertainment took the time to optimize Warcraft II for the Mac. It used Apple's Sound Sprocket API to create 3-D-panning stereo sound for the game (you'll be able to get the 3-D sound only if you're using a PowerPC-based machine). Blizzard also added speech recognition, so you can vocally command your troops in battle. And the graphics in Warcraft II have been updated to show plenty of detail, right down to the outhouse behind the town hall.

One of the problems with the first game was the interface. You could select only four characters at a time, and scrolling wasn't fast enough. Both problems have been corrected in the sequel: You can now select up to nine characters at a time, and scrolling is quick and smooth. Also, access to the menu options has been improved.

In Warcraft, if you had a really active screen (lots of character movement and buildings — maybe even a battle or two going on at the same time), you'd experience slowdowns and choppy scrolling. But Warcraft II's speed doesn't seem to be affected by busy screens, even with the increased graphic detail.

Up to eight players can participate in a Warcraft II game, and there's support for TCP/IP connections. Warcraft II will come with a scenario editor that lets you create custom levels, and it also has a sound-effects editor.

If you'd like to check out the Warcraft II demo for yourself, you can download it from MacUser Software Central (http://www.zdnet.com/macuser/software/). Be warned: The demo doesn't do justice to the incredible variety and detail of the real thing. Trust me — Warcraft may have been an addictive game, but Warcraft II goes well beyond its predecessor and should probably be classified as a controlled substance.

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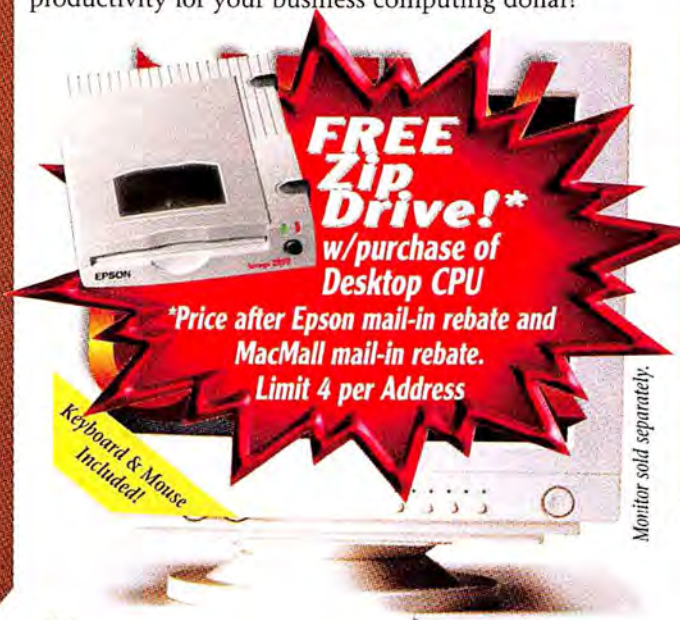

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- *The unique case design gives you the power you want in a space saving model*
- *4 useable PCI slots give you more flexible expansion options so the machine can grow as your business grows (one slot used for graphics card)*
- *Standard on-site warranty from UMAX*

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Extra! Extra! Complete Your System!

External V.34 28,000 Modem $94.99 #78149

Apple® Multiple Scan 1705 Display $759 #75945

FreeHand 5.5 FREE with your Mac OS Compatible Purchase! See Page 9 For Details

PowerComputing

180MHz ONLY $1495 #83834 (Low profile)

How'd they do that? That was our first thought after checking out Power Computing's NEW PowerBase series! This revolutionary Mac OS compatible series features a 180MHz system as low as $1495, a 200MHz system as low as $1795 and a 240MHz (yes, we said 240MHz) as low as $2195!

The fastest Mac OS speeds aren't the only thing the PowerBase has going for it. You can easily upgrade to faster future processors with a simple daughtercard swap. Each PowerBase is packed with a super-speedy 8X CD-ROM drive for fast access to hundreds of multimedia titles. The series is available in desktop (with one 51/4" bay and two 31/2" bays) and tower models (includes three 51/4" bays and an extra 31/2" bay for even more expandability). Plus, each model comes with a ton of great software. Impossible? Check the specs at the left, then call us to order. It's the super-affordable route to the fastest Mac OS system ever.

Everything You Ever Wanted to Know about the Power Base

microprocessor
- 240/200/180MHz PowerPC 603e RISC microprocessor with integrated Floating-point processor and 32K on-chip cache

secondary cache
- 256K Level-2 Cache standard

memory
- 16MB RAM, expandable to 160MB

graphics
- Graphics expansion with 2MB EDO DRAM
- SVGA connector along with Mac 15-pin
- Resolutions from 640 x 480 to 1280 x 1024

hard disk
- Internal 3.5" 1.2GB IDE hard disk

cd-rom drive
- 8x rotational speed; 120KB sustained transfer rate

networking
- Two high-speed serial parts for LocalTalk, modem, printers or other devices (compatible with GeoPort)

audio
- CD quality, 16-bit stereo 44.1KHz sample rate, in and out

expansion
- Three PCI Expansion Slots

other I/O ports
- Single-channel SCSI Interface
- One ADB port for included keyboard and mouse
- One port for PS/2 keyboard

All Power Computing Systems Come With The Following FREE
MacOS 7.5.3, 105-Key ADB Keyboard, Ergonomic ADB Mouse, FWB Hard Disk Toolkit PE, FWB CD-ROM Toolkit, Claris Works, Grolier's Encyclopedia, Now Contact, Now Up-to-Date, Nisus Writer (Trial), Intuit's Quicken SE, America Online (Trial), Compuserve (Trial), Launch CD, 250 Bitstream Fonts, US CD Atlas, World CD Atlas, The Animals! CD-ROM

Power Base 200	$1795.99	#83832
200MHz 603e Processor, 16MB RAM, 1.2GB Hard Drive, 8xCD-ROM Drive, 2MB EDO DRAM		
Mini-Tower Power Base 200	1895.99	#83831
Power Base 240	2195.99	#83830
240MHz 603e Processor, 16MB RAM, 1.2GB Hard Drive, 8xCD-ROM Drive, 2MB EDO DRAM		
Mini-Tower Power Base 240	2295.99	#83829

Power Base 180
180MHz 603e Processor
16MB RAM
1.2GB Hard Drive
8xCD-ROM Drive
2MB EDO DRAM
$1495 #83834
Mini-Tower $1595 #83833

MacWEEK ◆◆◆◆◆

(Monitor sold separately)

FREE Zip Drive!* w/purchase of Desktop CPU
*Price after Epson mail-in rebate and MacMall mail-in rebate. Limit 4 per Address

Keyboard & Mouse Included

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180MHz Mac OS System for Only $1495!

OFFER CODE MacUser ZMUS6B1

MacMall SPECIAL MacMall SPECIAL

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SCSI VERSION

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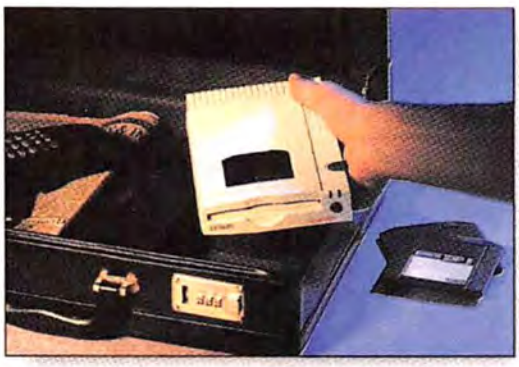
-$50 Epson Mail-in Rebate

$129.99* Your Price

#82687

* $129.99 price after $50 Epson mail-in rebate. Limit of 4 rebates per mailing address. Rebate expires 9/30/96.



Epson's lightweight Zip Drive takes up little space & easily fits in a briefcase!

Check Out the Specs!

- Uses affordable 100MB capacity disks
- Works like a floppy drive, but with the speed of a hard disk
- Each Zip disk equals 70 floppies
- Average seek time of 29ms
- Up to 1.4MB/second data transfer rate
- Completely compatible with Iomega Zip Drives and disks
- Connects to any SCSI port
- 1-year warranty

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QUANTITY	PRICE	YOU SAVE	ORDER #
10+	$13.99 ea.	$6/Cartridge	82229
5 TO 9	$15.99 ea.	$4/Cartridge	82229
1 TO 4	$19.99 ea.		82229

MacMall Place Your Order 24 Hours a Day 1-800-217-9498

LIMITED TIME OFFER!

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Sometimes, letter-size paper and printing is just too small! The Canon BJC-4550 makes it easy to print both letter-size and up to 11" x 17" documents in vibrant color (and at a price that's easy on your wallet).

$499.99 #82311

- 11" x 17" format
- Includes Canon Creative software for printing t-shirts, greeting cards and more (*IBM format)
- Color printing at 720 x 360 dpi; PC/Mac dual platform capabilities
- Fast printing: 5ppm black, 1ppm color
- Optional Photo kit for photo-realistic color

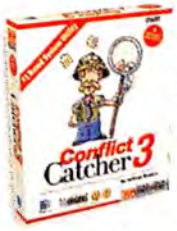
Check this out! For just $499.99, you can order the lowest priced wide-format color Canon Bubble Jet printer ever! Use it to print brilliant color documents on plain paper for Canon Specialty papers at up to 11" x 17" in size (perfect for flyers, posters, legal-sized documents and even blueprints).
It prints at a stunning 720 x 360 dpi for cleaner, crisper resolution and output. It includes a Canon-developed driver for AutoCAD users (for completely accurate drafts of your CAD drawings). And it prints at a speedy 5 pages per minute for color and 1 page per minute for black drafts. Plus, its dual-platform design helps you print on both PCs and Macintosh computers. Order it today. It's your best value for quality wide-format color printing.

Take a Look at these Printer Extras from MacMall & Canon!

- **BC-22 Photo Kit** (for use with BJC-4200 and BJC-4500) $45.99 #82929
- **BC-29F Neon** (for use with BJC-4000 series Color Bubble Jet printers) $37.99 #82930
- **GC-101 Greeting Cards** (20 white cards and 20 white envelopes) $6.99 #82931
- **TR-101** (50 T-Shirts transfers and instructions) $29.99 #82932

4 SUPER Bundles from MacMall!

Your Macintosh® Startup files crash, freeze your screen and give you printing hassles. What to do? Just order Conflict Catcher 3. It puts you in control of your Startup software and you save memory, time and any future Mac™ trouble.
Conflict Catcher 3 helps identify Startup files and finds conflicts between them. It manages your Startup software to prevent any future problems, and can manage Extensions, Control Panels, Fonts and more. Order one of our exclusive bundles and save yourself time, memory and conflict headaches plus a whole lot more!



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$139.99
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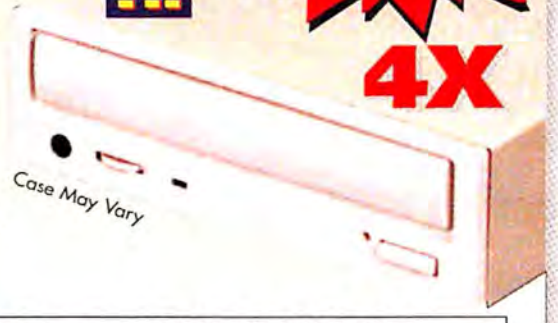
It's instant multimedia access! This 4X CD-ROM drive plays both your multimedia and audio CDs (for hundreds of reference and edutainment choices). Just connect the drive via its SCSI connection into any parallel port and start spinning your discs.



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Access the information on your CD-ROMs faster than ever before! The CD-ROM Toolkit uses a highly efficient SCSI device driver and driver-based caching, making your data requests as much as twenty times faster. It improves transfer rates and helps you access all the most popular CD formats. It's the perfect partner to your 4X CD-ROM drive.

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You can use your new FREE Zip Drive as a second hard drive for your new CPU. Store all your big, space-hungry files, documents and multimedia projects on its convenient removable Zip cartridges. Backup your entire hard drive for safekeeping. And even run your big, seldom-used applications, right off your Zip Drive (it's that fast and efficient)!

And all you have to do to take advantage of this offer is purchase any desktop CPU (there are dozens to choose from in this insert).

HERE'S HOW IT WORKS:

1. *Purchase any desktop CPU*
2. *Check inside the Zip Drive box for two rebates: one from Epson and another from MacMall*
3. *Send in your rebates and receive reimbursement. The result? Your drive is FREE.*

limit 4 rebates per mailing address

Hurry and order today to take advantage of this amazing one-time deal. This exclusive offer is only good while supplies last.

BONUS BONUS BONUS BONUS BONUS

FREE Freehand 5.5, Too!

w/your Desktop CPU or Macintosh® PowerBook® Purchase!

Purchase a Macintosh PowerBook and get a FREE copy of FreeHand 5.5! But, purchase any desktop CPU and get BOTH FreeHand 5.5 and an Epson Zip Drive, absolutely FREE! You can use your new Zip Drive for storing your big files, backing up your hard drive and even running applications. FreeHand 5.5 is an instant graphics and illustration powerhouse (we even use it here at MacMall). You can use its special tools like its Starburst tool to create stunning special effects. Experiment with shapes, blending and layering. And place your illustrations in your publications or even online! It's shipped in promotional packaging with online documentation on CD-ROM.

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We'll beat ANY Advertised Catalog Price From The Following:

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STUFF THE LAWYERS MADE US PUT IN

This offer applies only to legitimate, advertised prices offered by the competitors listed above in their most recent catalogs. We may require proof of competitor's pricing. Advertised item must be identical to the one offered by MacMall and must be a new item in a factory-sealed box. We reserve the right to limit quantities ordered. This offer does not apply to special, bonus or free offers, grand openings, special purchases or special buys, manufacturer's rebates, close-outs, clearances, or to competitors' one-of-a-kind or other limited quantity offers. This offer is also not open to dealers and does not apply to ad errors made by any of the companies listed above. We'll beat the price by at least a buck! Offer expires 9/30/96.

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   Hours: Mon-Fri 9am - 9pm (EST) • Mon-Fri 6am - 6pm (PST)
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Apple Power Macintosh®

as low as $2299

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(monitors & keyboards sold separately)

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*Free after Epson mail-in rebate and MacMall mail-in rebate. Limited 4 per household.

	9500	8500	7600	7200	
Model ➤	9500/200MHz/32/2GB/8XCD L2 cache w/video card	8500/180MHz/32/2GB/8XCD/L2	7600/132MHz/16/1.2GB/8X CD/L2	7200/120 16/1.2GB/8XCD/L2	7200/120 24/1.2GB/8XCD/L2/DOS Card
SPEED	200MHz	180MHz	132MHz	120MHz	120MHz
PROCESSOR	PowerPC™ 604e	PowerPC™ 604e	PowerPC™ 604	PowerPC™ 601	PowerPC™ 601
MEMORY (RAM)	32MB (768MB Max); 512K level 2 cache	32MB (512MB Max); 256K level 2 cache	16MB (512MB Max); 256K level 2 cache	16MB (256MB Max); 256K level 2 cache	16MB (256MB Max) 8MB DOS (72MB max)
VRAM	2MB (4MB Max)	2MB (4MB Max)	2MB (4MB Max)	1MB (4MB Max)	1MB (4MB Max)
EXPANSION SLOTS	6 PCI Slots	3 PCI Slots	3 PCI Slots	3 PCI Slots	3 PCI Slots (one occupied by DOS Card)
EXPANSION BAYS	8x CD-ROM Drive Internal, 2 3.5" bays	8x CD-ROM Drive Internal, 1 3.5" bays	8x CD-ROM Drive Internal, 1 3.5" bays	8x CD-ROM Drive Internal, 1 3.5" bays	8x CD-ROM Drive Internal, 1 3.5" bays
FLOPPY DRIVE	1.4MB Internal	1.4MB Internal	1.4MB Internal	1.4MB Internal	1.4MB Internal
HARD DRIVE	2GB	2GB	1.2GB	1.2GB	1.2GB
NETWORKING	Built-in LocalTalk & Ethernet (10Base-T & AAUI) connections	Built-in LocalTalk & Ethernet (10Base-T & AAUI) connections	Built-in LocalTalk & Ethernet (10Base-T & AAUI) connections	Built-in LocalTalk & Ethernet (10Base-T & AAUI) connections	Built-in LocalTalk & Ethernet (10Base-T & AAUI) connections
SCSI SUPPORT	Internal FAST SCSI bus (10MB Max), External SCSI bus (5MB Max)	Internal FAST SCSI bus (10MB Max), External SCSI bus (5MB Max)	Internal FAST SCSI bus (10MB Max), External SCSI bus (5MB Max)	Internal/External SCSI bus (5MB Max)	Internal/External SCSI bus (5MB Max)
PORTS	2 serial, SCSI, ADB, monitor, 16-bit stereo sound-input/output	2 serial, SCSI, ADB, monitor, composite/s-video i/o, 16-bit stereo i/o, audio line i/o,	2 serial, SCSI, ADB, composite/s-video input, 16-bit stereo i/o, audio line i/o	2 serial, SCSI, ADB, monitor, 16-bit stereo sound-input/output ports	2 serial, SCSI, ADB, monitor, 16-bit stereo sound-input/output ports
OPTIONS	Upgradeable to faster processor when available	Upgradeable to faster processor when available	Upgradeable to faster processor when available	Upgradeable to PowerMac 7600 logic board (by Apple service center only)	Upgradeable to PowerMac 7600 logic board (by Apple service center only)
ORDER# Price	#83800 $4899	#83801 $4499	#83803 $2999	#83805 $2299	#83804 $2799
Also Available	9500/180MHz/32/2GB/8xCD/L2 Cache (multi-processor Model) #83799 $5699	8500/150 16/1.2GB/8x/L2 #83802 $3599			

Mac OS Compatibles

as low as $1495

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Power Center 150 16/1GB/4xCD/L2 $2095 #83787

PowerComputing

UMAX COMPUTER CORPORATION

SUPERmac

(monitors sold separately)	PowerBase	Power Tower	Power Tower Pro	J700L	S900L
Model ➤	180 16/1.2GB/8xCD/2MB VRAM	200e 16/2GB/8xCD/L2	180 16MB/2GB/8XCD/8VRAM/L2	150/16/2GB/8X CD (tower)	180/32/2.1GB/8X CD/4MB VRAM
SPEED	180MHz	200MHz	180MHz	150MHz	180MHz (dual processor)
PROCESSOR	PowerPC™ 603e	PowerPC™ 604e	PowerPC™ 604e	PowerPC™ 604	PowerPC™ 604e
MEMORY (RAM)	16MB (160MB Max); 256K L2 cache	16MB (512MB Max)	16MB (1GB Max); 1MB L2	16MB (1GB Max); 512K L2 cache	32MB (1GB Max) 512K L2 cache
VRAM	2MB EDO DRAM	IMS Twin Turbo 128M graphics card	IMS Twin Turbo 128M graphics card	IMS Twin turbo 128M graphics card	IMS Twin Turbo 128M graphic card
EXPANSION SLOTS	3 PCI Expansion slots	3 PCI Expansion slots	6 PCI slots	4 PCI slots	6 PCI slots w/PCI to PCI Bridge
EXPANSION BAYS	8x CD-ROM ; 1 internal 3.5" bay for internal hard drive	8x CD-ROM; 3 front accessible 5.25"bays, 1 internal 3.5" bay	8x CD-ROM Internal; 4 front 5.25" 3.5" bay for internal hard drive	Internal 6.7x CD-ROM Drive	5 expansion bays (2 internal/3 external)
FLOPPY DRIVE	1.4MB disk drive	1.4MB disk drive	1.4MB disk drive	1.4MB Internal	1.4MB Internal
HARD DRIVE	1.2GB IDE	2GB AV drive	2GB AV drive	2.1GB	2.1GB
NETWORKING	Built-in LocalTalk	Built-in Ethernet	Built-in LocalTalk	Built-in LocalTalk & Ethernet	Built-in LocalTalk & Ethernet
SCSI SUPPORTS	Internal/external Fast SCSI	Single channel SCSI interface	Dual channel SCSI	External SCSI	16-bit Ultra SCSI-III
PORTS	(2) Serial, ADB, SCSI, PS/2 Keyboard, 16-Bit sound	(2) Serial, ADB, monitor, 16-Bit stereo audio	(2) Serial, ADB, SCSI, 16-Bit sound	(2) Serial, SCSI, ADB, Monitor, 16-Bit stereo sound	(2) Serial, SCSI, ADB, monitor, 16-Bit Stereo
OPTIONS	Upgradeable CPU Card, PCI-based Ethernet	Upgradeable CPU Card	Upgradable CPU Card, PCI-based Ethernet	Processor upgradeable with 180 or 200MHz Primary Processor Card	Extended performance ultra wide SCSI III & 100Base-T card
ORDER# Price	#83834 $1495	#83791 $3595	#83792 $4195	#83782 $2995	#83783 $4695
Also Available	200 16/1.2GB/8xCD/2MB VRAM low profile #83832 $1795 240 16/1.2GB/8xCD/2MB VRAM low profile #83830 $2195 ADD $100 for MINI-TOWER MODELS	180e 16/2GB/8xCD/L2 #83790 $3295 180 16/2GB/4xCD/L2 #83789 $3095 166 16/2GB/4xCD/L2 #83788 $2895	200 16/2GB/8xCD/L2/8MB VRAM #83793 $4495 225 16/2GB/8xCD/L2/8MB VRAM #83794 $4995 See Page 9 for details Hurry offer ends 9/30/96		604/15016/ 6.7xCD no hard drive or graphics card #83780 $2995 NEW! 604/180 32/2GB/8xCD 4MB VRAM #83785 $3995 604/150 32/2GB/8xCD 4MB VRAM #83781 $3695 NEW! 604e/200 32/2GB/8xCD 4MB VRAM #83784 $4295

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Apple Macintosh PowerBook

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	5300ce	5300c	2300c	190
Model ➤	POWERBOOK® 5300ce 32/1.1GB	POWERBOOK® 5300c 8/500	POWERBOOK Duo® 2300c 8/750	POWERBOOK® 190 8/500
SPEED	117MHz	100MHz	100MHz	66/33MHz
PROCESSOR	PowerPC™ 603e	PowerPC™ 603e	PowerPC™ 603e	Motorola 68LC040
MEMORY (RAM)	32MB (64MB Max)	8MB (64MB Max)	8MB (56MB Max)	8MB (40MB Max)
STORAGE	1.4" internal floppy drive, 1.1GB hard drive	Internal 1.4" floppy drive, 500MB hard drive	750MB internal hard drive	Internal 1.4", 500MB
NETWORKING	Built-in LocalTalk connection; built-in infrared technology; AppleTalk & Apple Remote Access software; Ethernet networking through PC cards	Built-in LocalTalk connection; built-in infrared technology; AppleTalk & Apple Remote Access software; Ethernet networking through PC cards	Built-in LocalTalk connection; AppleTalk & Apple Remote Access Software	Built-in LocalTalk connection; AppleTalk & Apple Remote Access Software
EXPANSION	2 Type I or Type II PC slots or 1 Type III PC card slots; expansion bay for additional drives RAM slot	2 Type I or Type II PC slots or 1 Type III PC card slots; expansion bay for additional drives RAM slot	2 internal slots; 1 for RAM/1 for optional Duo Express Modem	2 Type I or Type II PC slots or 1 Type III PC card slots; additional drives; RAM slot
DISPLAY	10.4" Backlit Active Matrix Color SVGA LCD	10.4" Backlit Active-Maxtrix Color LCD	9.5" backlit active-maxtrix color LCD	9.5" backlit active-maxtrix color LCD
BATTERY	2.5 to 4.5 hours	2.5 to 4.5 hours	2.5 to 4.5 hours	2.5 to 4.5 hours
PORTS	Serial, SCSI, Video ADB, Power Adapter, 16-Bit Stereo Sound, Integrated Microphone	Serial, SCSI, Video ADB, Power Adapter, 16-Bit Stereo Sound, Integrated Microphone	Docking connectors, LocalTalk serial modem, power adapter, integrated microphone	ADB, SCSI, Serial, 16-bit stereo sound, integrated microphone
WEIGHT	6.4 lbs.	6.4 lbs.	4.8 lbs.	6.3 lbs
ORDER# Price	#83851 $4299	#83853 $2499	#83865 $2499	#83855 $899
Also Available		5300c/100 16/750 #83852 $2999	Duo® 2300c 20/1.1GB #83864 $3499	

Apple Macintosh Performa

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SRS

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FREE Zip Drive! with purchase of any desktop CPU!
*Free after Epson mail-in rebate and MacMall mail-in rebate. Limit 4 per household.

	6400	6320	6300
Model ➤	6400CD 16/1.2GB/8X CD-ROM/28.8	6320CD 16/1.2GB/4X CD-ROM/15"/VI/TV	6300CD 16/1.2GB/8X CD-ROM/28.8
SPEED	200MHz	120MHz	100MHz
PROCESSOR	PowerPC™ 603e	PowerPC™ 603e	PowerPC™ 603e
MEMORY (RAM)	16MB (136MB Max), 256K level 2 cache	16MB (136MB Max,) 256K level 2 cache	16MB; 256K level 2 cache
VRAM	1MB DRAM	1MB DRAM	1MB DRAM
EXPANSION SLOTS	2 PCI slots; 1 communication slot; 1 video slot; 1 connector for TV tuner card	1 LC PDS, one communications slot for Ethernet or modem card, 1 video slot, 1 TV tuner slot	1 LC PDS, one communications slot for Ethernet or modem card 1 video slot, 1 TV tuner slot
EXPANSION BAYS	8X internal CD-ROM drive	4X CD	4X CD
FLOPPY DRIVE	1.4MB Internal	1.4MB Internal	1.4MB Internal
HARD DRIVE	2.4GB	1.2GB	1.2GB
NETWORKING	Built-In LocalTalk; optional Ethernet support through PCI slots	Built-In LocalTalk	Built-In LocalTalk
SCSI SUPPORT	High Performance SCSI	High Performance SCSI	High Performance SCSI
PORTS	2 serial ports, SCSI, ADB, stereo sound-input/output ports with integrated subwoofer & SRS 3D surround sound	2 serial ports, SCSI, ADB, mono sound-input, stereo sound-output	2 serial ports, SCSI, ADB, monitor, mono sound-input, stereo-output
OPTIONS	Apple Video, Presentation, and TV/FM Systems, PC Compatibility Card (586 only), Avid Cinema		Apple Video, Presentation, and TV/FM Systems, PC Compatibility Card (586 only), Avid Cinema
Order# Price	#83798 $2799	#83796 $2499	#83870 $2299
Also Available	6400/180 16/1.6GB/8xCD/28.8 #83797 $2399		

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Everything You Ever Wanted to Know about the Apple® Power Mac™ 7200!

microprocessor

- PowerPC™ 601 processor running @ 120 MHz
- Integrated floating-point unit
- 32K internal cache

memory

- 16MB of RAM, expandable to 256MB via 4 DIMM slots
- 256K-L2 cache (both models and Pentium Card)
- 8MB RAM on Pentium card (#83804 only), expandable to 72MB

disk drives

- Internal 1.2GB hard disk drive
- Internal Apple SuperDrive® floppy disk drive that uses high-density, 1.4MB floppy disks and reads, writes, and formats Macintosh, Windows, MS-DOS, OS/2 and ProDOS disks
- Internal 8X speed CD-ROM drive

sound

- Stereo 16-bit sound
- Audio line input/output ports

interfaces

- Ethernet Connection through its AAUI & 10Base–T connectors
- 3.5" internal expansion bay for additional storage device
- Three PCI 2.0-compatible internal expansion slots (one slot taken by Pentium card on #83804)
- Two High-speed DMA GeoPort-compatible serial ports
- Apple Desktop Bus (ADB) expansion port
- Internal/External SCSI ports

display support

- 1MB video RAM, expandable to 4MB
- Display up to 24-bit color @ 1024 x 768 pixel resolution
- 16-bit stereo sound input/output ports

pentium card (selected models)

- Pentium 100MHz processor
- 8MB RAM, expandable to 72MB
- 256K level 2 cache
- 1MB DRAM of display support
- Supports Novell NetWare SPX/IPX, TCP/IP, and NETBEUI protocols in MS-DOS and Windows environment

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New 120MHz
16MB RAM
1.2GB Hard Drive
8X CD-ROM Drive
256K level 2 cache
$2299
#83805

New 120MHz
24MB RAM
16MB Mac OS®
8MB Pentium Card
1.2GB Hard Drive
8X CD-ROM Drive
100MHz Pentium Card
$2799
#83804

Monitor & Keyboard Sold Separately

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512K Cache	$199	#80336
256K Cache	$99	#80335
8MB 70ns 64-Bit DIMMS	$89	#72645
16MB 70ns 64-Bit DIMMS	159	#72646
32MB 70ns 64-Bit DIMMS	.299	#72647
Installation	...30	#2214

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Digital Camera
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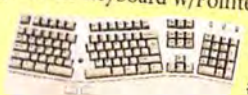
Apple Multiple Scan
15" Color Display
$479 #66068

Adesso TruForm
Ergonomic Keyboard w/Pointer



$89.99 #71990

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Everything You Ever Wanted to Know about the Apple® Power Mac™ 7600!

microprocessor

- PowerPC 604 processor running @ 132MHz
- Integrated floating-point unit
- 32K internal cache

memory

- 16MB of RAM, expandable to 512MB via 8 DIMM slots
- 256K-L2 cache

disk drives

- Internal 1.2GB Fast SCSI disk drive
- Internal 8X speed CD-ROM drive
- Expansion bay for additional 3.5" hard drive

sound

- Stereo 16-bit sound input/output ports
- Audio line input/output ports

interfaces

- Ethernet Connection through its AAUI & 10Base–T connectors
- Internal DAV connector for video compression/decompression cards
- Three PCI 2.0-compatible internal expansion slots
- Two High-speed DMA GeoPort-compatible serial ports
- Apple Desktop Bus (ADB) expansion port
- Internal Fast SCSI bus/External SCSI bus
- Composite video and S-video input ports

display support

- 2MB video RAM, expandable to 4MB & fast 64-bit data path to VRAM
- DB-15 connector for monitor & display up to 24-bit color @ 1152 x 870 pixel resolution

604/120 Processor Upgrade Card	~~was $599.99~~ Now	$399.99 #81580
604/132 Processor Upgrade Card	~~was $899.99~~ Now	$599.99 #81581
PC Compatibility Card (586/100MHz/8MB RAM)		$799.99 #81190
PC Compatibility Card (Pentium/100MHz/8MB RAM)		$1049.99 #81189

New *132MHz 16MB RAM 1.2GB Hard Drive 8X CD-ROM Drive 256K level 2 cache*

$2999 #83803

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32MB 70ns 64-Bit DIMMS	.299	#72647
Installation	30	#2214

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MacALLY Extended
105-key Keyboard

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NEW 180MHz

Everything You Ever Wanted to Know about the Apple® Power Mac™ 8500!

microprocessor

- 150-MHz PowerPC™ 604 Processor or 180-MHz PowerPC™ 604e Processor
- Integrated floating-point unit
- 32K internal cache (150MHz) or 64K internal cache (180MHz)

memory

- 16 or 32MB of RAM, expandable to 512MB via 8 DIMM slots
- 256K L2 cache

disk drives

- Internal 1.2 or 2GB Fast SCSI disk drive
- Internal 8X speed CD-ROM drive
- Expansion bay for additional 3.5" hard drive

sound

- Stereo 16-bit sound; up to 44.1kHz sampling
- Audio line input/output ports

interfaces

- Ethernet Connection through its AAUI & 10Base–T connectors
- Internal DAV connector for video compression/decompression cards
- Three PCI 2.0-compatible internal expansion slots
- Two High-speed DMA GeoPort-compatible serial ports
- Apple Desktop Bus (ADB) expansion port
- Internal Fast SCSI bus/External SCSI bus
- RCA phono jacks for line-level stereo audio input and output
- mini-jacks for stereo audio input and output
- Connectors (RCA) for composite video input and output
- S-video input and output connectors

display support

- 2MB video RAM, expandable to 4MB & fast 64-bit data path to VRAM
- DB-15 connector for monitor & display up to 24-bit color @ 1152 x 870 pixel resolution

New 150MHz
16MB RAM
1.2GB Hard Drive
8X CD-ROM Drive
512K level 2 cache
$3599
#83802

New 180MHz
32MB RAM
2GB Hard Drive
8X CD-ROM Drive
512K level 2 cache
$4499
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FREE Zip Drive!*
w/purchase of Desktop CPU
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8MB 70ns 64-Bit DIMMS	$89	#72645
16MB 70ns 64-Bit DIMMS	159	#72646
32MB 70ns 64-Bit DIMMS	.299	#72647
Installation	$30	#2214

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AppleDesign® Keyboard $84.99 #65608

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*Price after Epson mail-in rebate and MacMall mail-in rebate.
Limit 4 per Address

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Everything You Ever Wanted to Know about the Apple® Power Mac™ 9500!

microprocessor

- PowerPC 604e processor running @ 200MHz or two PowerPC 604e processors running @ 180MHz
- Integrated floating-point unit, 64K internal cache

memory

- 32MB of RAM, expandable to 768MB via 12 DIMM slots
- 512K L2 cache

disk drives

- Internal 2GB Fast SCSI disk drive
- Internal 8X speed CD-ROM drive
- Two expansion bays for additional 3.5" hard drives

sound

- Stereo 16-bit sound input/output (mini-jacks)
- Audio line level stereo input/output ports (RCA-jacks)

interfaces

- Ethernet Connection through its AAUI & 10Base–T connectors
- Six PCI 2.0-compatible internal expansion slots
- Two High-speed DMA GeoPort-compatible serial ports
- Apple Desktop Bus (ADB) expansion port
- Internal Fast SCSI bus/External SCSI bus

display support (configured through accelerated graphics card)

- 2MB video RAM, expandable to 4MB
- DB-15 connector for monitor
- Display up to 24-bit color @ 1152 x 870 pixel resolution
- Support for displays up to 1280 X 1024 pixel
- Up to 75Hz refresh rate

New *180MHz Dual Processor*
32MB RAM
2GB Hard Drive
8X CD-ROM Drive
512K level 2 cache
$5699
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New *200MHz*
32MB RAM
2GB Hard Drive
8X CD-ROM Drive
512K level 2 cache
$4899
#83800

The 180 Multi-Processor

The Power Mac 9500/180MP computer represents a new departure for Apple®; it's a multiprocessor system, with two 180MHz PowerPC 604e chips, which provides extremely rapid performance.

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Apple Extended Keyboard **$154.99**
#3411

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NEW Apple Power Mac™ Models

What's new with the Apple Power Mac™ 7200?

- 120MHz PowerPC 601 RISC with integrated math co-processor and 32K on-chip cache
- 16MB of RAM, 1MB of video RAM
- 3 PCI slots
- 8X CD-ROM drive
- 1.2 GB hard drive
- Includes DOS Card w/100MHz Pentium & 8MB RAM

For Details See Page 12!

NEW 120MHz $2799 #83804

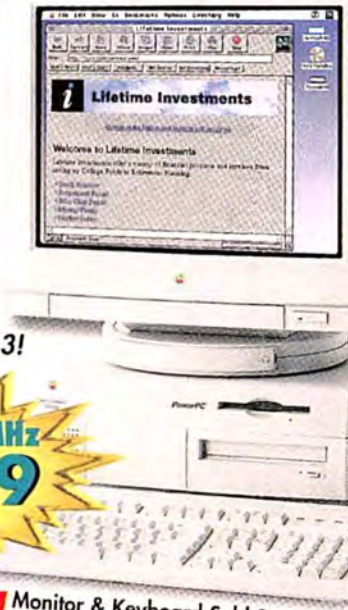
Monitor & Keyboard Sold Separately

Apple Power Mac 7200/120 16/1.2G/8XCD/L2
$2299 #83805

What's new with the Apple Power Mac™ 7600?

- 132MHz PowerPC 604 RISC with integrated math co-processor and 32K on-chip cache
- 16MB of RAM
- 2MB video RAM
- 3 PCI slots
- 8X CD-ROM drive
- 1.2 GB hard drive

For Details See Page 13!



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For Details See Page 15!

NEW 180MHz $4499 #83801

Monitor & Keyboard Sold Separately

For Details See Page 14!

What's new with the Apple Power Mac™ 9500?

- One 200MHz PowerPC 604e RISC or two 180MHz PowerPC 604e RISC with integrated math coprocessor and 64K on-chip cache
- 32MB of RAM
- 2MB video RAM
- 6 PCI slots; can accommodate a PC compatibility card
- 8X CD-ROM drive
- 2 GB hard drive
- Upgradeable to faster processor when available

Apple Power Mac 9500/200 32/2G/8XCD/L2/Video
$4899 #83800

What's new with the Apple Power Mac™ 8500?

- 150MHz PowerPC 604 RISC with integrated math co-processor and 32K on-chip cache or 180MHz 604e with a 64K on-chip cache
- 16MB or 32MB of RAM
- 2MB of video RAM
- 3 PCI slots
- 8X CD-ROM drive
- 1.2 or 2 GB hard drive
- Upgradeable to faster processor when available

Apple Power Mac 8500/150 16/1.2G/8XCD
$3599 #83802

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Factory Refurbished Apple® Macintosh® Performa® 6300 Just $1389!

HURRY! Very Limited Quantities

100MHz PowerPC™

- ✔ 603e RISC with integrated floating point co-processor
- ✔ 32k on-chip cache plus 256k level 2 cache
- ✔ 16MB RAM/1.2GB Hard Drive
- ✔ Internal Quad-Speed AppleCD™ 600i
- ✔ 28.8kbps Global Village Fax/Data/Voice Modem
- ✔ Internal Apple SuperDrive® floppy disk drive
- ✔ Built-in Apple LocalTalk®; Two serial ports, ADB Port, Sound input & output ports; SCSI port supports up to 5 SCSI devices
- ✔ Macintosh LC processor-direct expansion slot; Communications slot for Ethernet or modem card; Video slot for NTSC, PAL or SECAM video input card
- ✔ AppleDesign® Keyboard & Desktop Bus Mouse

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Apple Macintosh Performa 6300!

- ✔ 16MB RAM
- ✔ 1.2GB Hard Drive
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- ✔ 4X CD-ROM Drive
- ✔ PLUS 24 Software Titles **FREE**

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13.3" Viewable image size/.28mm dot pitch/640 X 480 to 832 X 624 resolution/ 60 to 75Hz refresh rate
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Everything You Ever Wanted to Know about the Macintosh® Performa® 6320CD!

microprocessor
- PowerPC™ 603e processor running @ 120 MHz
- Integrated floating-point unit
- 32K internal cache

memory
- 16MB of RAM, expandable to 64MB
- 256K-L2 cache

disk drives
- Internal 1.2GB hard disk drive
- Internal quadruple speed CD-ROM drive

modem
- Internal, up to 28.8kbps data and 14.4kbps fax modem

sound
- Stereo 16-bit sound
- Sound input/output ports
- Built-in speaker

interfaces
- Apple Desktop Bus (ADB) expansion port
- Serial Port for network or other connection
- SCSI interface port supports up to 5 external SCSI devices
- LC Processor direct expansion slot
- Composite and S-video inputs
- Apple TV/Video System

display
- Includes Apple Multiple Scan 15" display
- 1MB DRAM video buffer
- Display up to 16-bit color @ 640 x 480 pixel resolution

PLUS 32 Software Titles, FREE! Including:
- Macintosh System 7.5
- ClarisWorks
- Quicken Special Edition
- America Online
- MegaPhone for Performa
- WealthBuilder
- Expresso
- MacLink Plus/Easy Open Translators
- At Ease™
- Virex
- The Writing Center
- The American Heritage Dictionary
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- Power Pete
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- ***and 14 more!***

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Installation	$30	#2214

Extra Extra!

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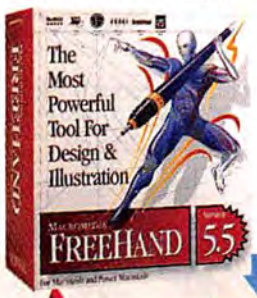

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16MB 70ns 64-bit DIMMS	$159	#72646
32MB 70ns 64-bit DIMMS	$299	#72647
Installation	$30	#2214

Everything You Ever Wanted to Know about the Macintosh® Performa® 6400CD!

microprocessor

- PowerPC 603e processor running @ 180 or 200MHz
- Integrated floating-point unit
- 32K internal cache

memory

- 16MB of RAM, expandable to 136MB
- 256K-L2 cache

disk drives

- Internal 1.6 or 2.4GB hard disk drive
- Internal 8X speed CD-ROM drive

modem

- Internal, 28.8kbps data/fax/voice modem

sound

- Stereo 16-bit sound with SRS surround-sound enhancement
- Sound input/output ports
- Built-in sub-woofer speaker

interfaces

- Apple Desktop Bus (ADB) expansion port
- 2 serial ports for network or other connection
- SCSI interface port supports up to 5 external SCSI devices
- Expansion bay for 5.25" internal SCSI device
- 2 PCI expansion slots
- Expansion bay for optional Apple TV/FM Radio System

display support

- 1MB VRAM
- Display up to 16-bit color @ 640 x 480 or 800 X 600 pixel resolution

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- ClarisWorks 4.0 (PPC)
- Quicken Special Edition
- America Online
- MegaPhone
- Web Workshop
- Surf Watch
- MacLink Plus/Easy Open Translators
- At Ease 3.0 w/update
- DOGZ Adoption Kit
- The American Heritage Dictionary
- MacGallery Clip Art Treasure Pak
- Adobe™ Photo Deluxe
- NOW Touchbase and DatabookPro
- Grolier Multimedia Encyclopedia
- Blockbuster Guide to Movies & Videos
- 3D Atlas
- Thinkin Things 2
- **plus 7 more!**

180MHz	*200MHz*
16MB RAM	*16MB RAM*
1.6GB Hard Drive	*2.4GB Hard Drive*
8X CD-ROM Drive	*8X CD-ROM Drive*
28.8 Modem	*28.8 Modem*
$2399 #83797	$2799 #83798

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Choose the 190 grayscale version for just $899 or the color 10.4" dual scan display version for a low $1199. Each model includes a 66MHz processor, 8MB RAM and a 500MB hard drive! And of course you get stereo sound, built-in networking and the ability to upgrade to PowerPC. With a PowerBook 190, you can run hundreds of your favorite programs (right out the box) and stay more productive wherever you go.

So, if you're looking for a low-cost and expandable laptop (that can get the job done), look no further than a PowerBook 190. It's no compromise! It's the best laptop choice for a person that wants to stay productive (wherever they go) *without* spending much money trying!

Everything You Wanted To Know About The Macintosh® PowerBook® 190 Series!

processor
- 68LC040 processor

speed
- 66/33MHz

memory
- 8MB of RAM, expandable to 40MB

storage
- Apple SuperDrive® floppy drive

display
- 9.5" grayscale or 10.4" dual scan color

weight
- 6.0lb/6.3lb.(cs model)

expansion capabilities
- Memory expansion slot; PC Card slots for two Type I or Type II PC Cards or one Type III PC Card; expansion bay for third-party solutions

ports
- Serial port, ADB port, video-output port (optional), power adapter port, SCSI port

battery
- Nickel-metal-hydride; average life: 2.5 to 4.5 hours; power adapter included

sound
- Output port (stereo); integrated microphone and speaker

networking
- Built-in LocalTalk port; optional infrared technology supports AppleTalk protocol; Ethernet networking through PC Cards

Apple Macintosh® PowerBook® 190 8/500 9.5" grayscale display..... $899 #83855

Apple Macintosh® PowerBook® 190CS 8/500 10.4" dual scan color display..... $1199 #83854

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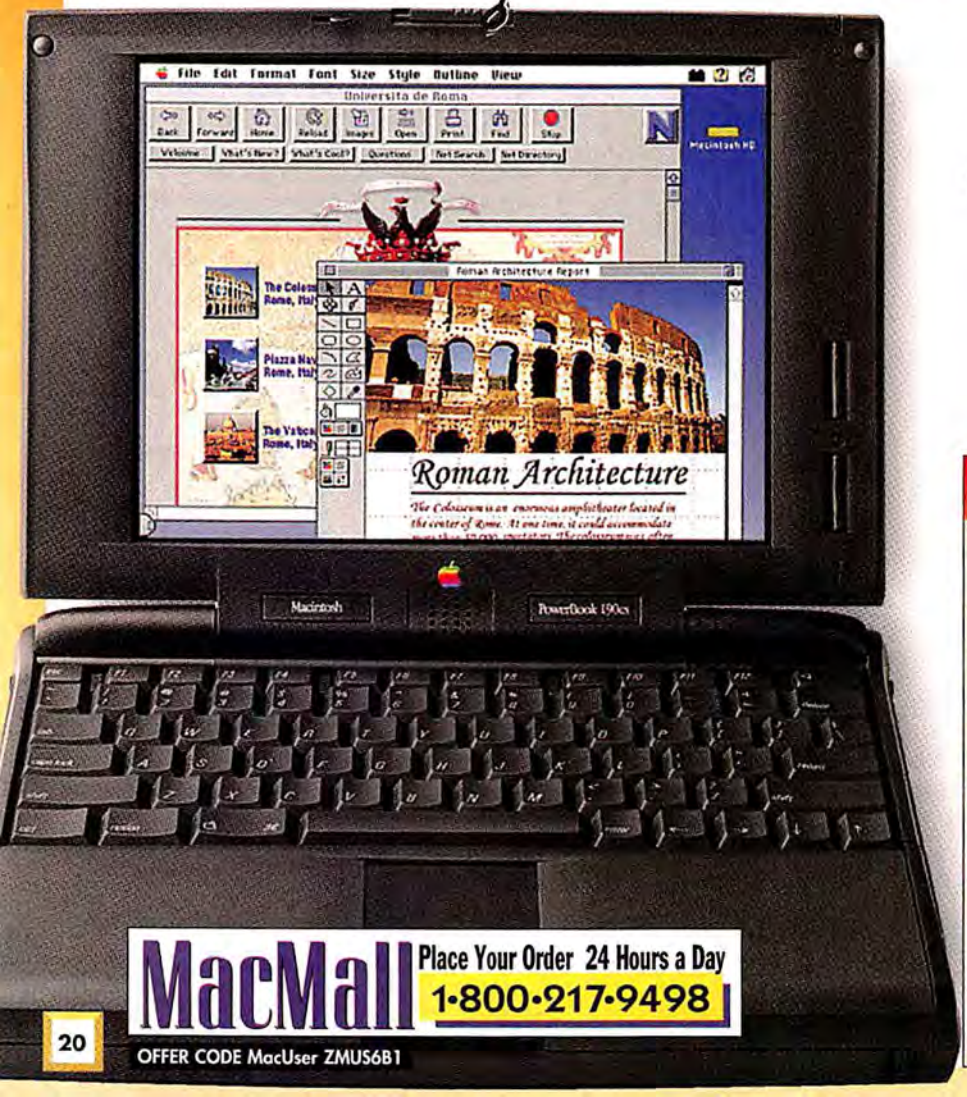
Clip & Compare



Apple Macintosh PowerBook 190 8/500 9.5" Grayscale Display

$899 #83855

Apple Macintosh PowerBook 190cs 8/500 *10.4" dual scan* **COLOR** *display*

$1199 #83854

For Your PowerBook

Apple® Macintosh® PowerBook® 190 8-bit Color Video-out Upgrade kit ..... $159.99 #77172

Apple® Infrared Upgrade kit for PowerBook® 190 Series ..... 54.99 #77173

BTI Mini AC Adapter for 190 & 5300 series .... 74.99 #75159

Memory For Your PowerBook 190

4MB ..... $89 #77413

8MB ..... 129 #77414

16MB .... 259 #77415

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➤ 8MB of RAM, expandable to 64MB

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➤ Apple SuperDrive® floppy drive

display
➤ 10.4" Dual-Scan color display

weight
➤ 6lb. (2.8kg)

sound
➤ 16-bit audio line input & output; integrated microphone & speaker

expansion capabilities
➤ Memory expansion slot; PC Card slots for two Type I or Type II PC Cards or one Type III PC Card

ports
➤ Serial port, ADB port, video output port, power adapter port, SCSI port, sound i/o port

battery
➤ Nickel-metal-hydride; average life: 2.5 to 4.5 hours; power adapter included

networking
➤ Built-in LocalTalk port; built-in infrared technology supports AppleTalk protocol; Ethernet networking through PC Cards

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MACWORLD MW EDITORS' CHOICE April 1994

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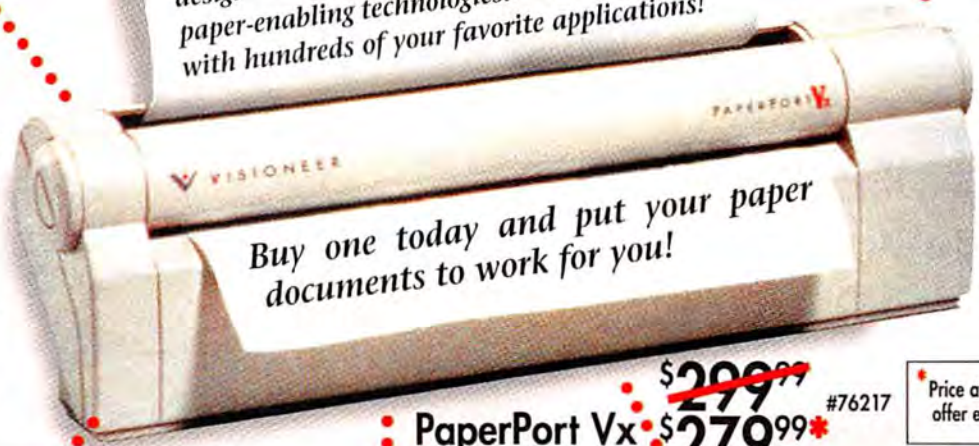

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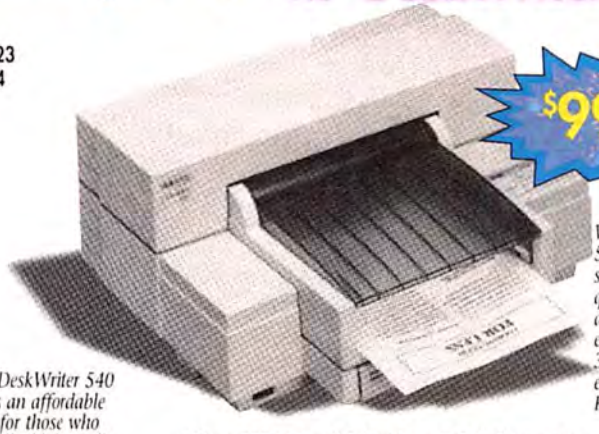
HP DeskWriter 520



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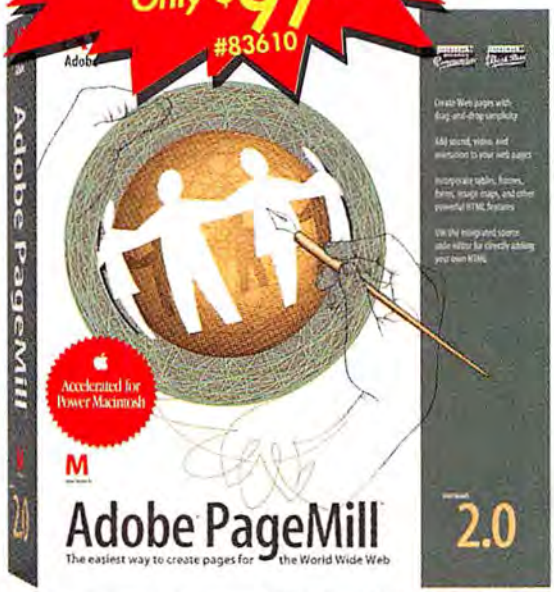

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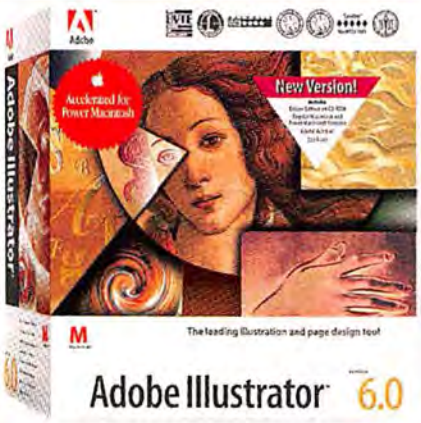

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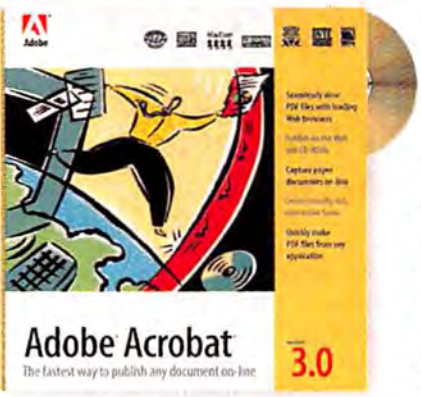

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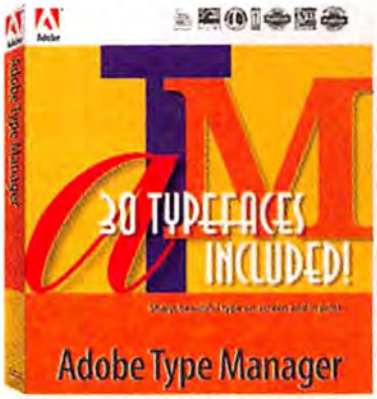

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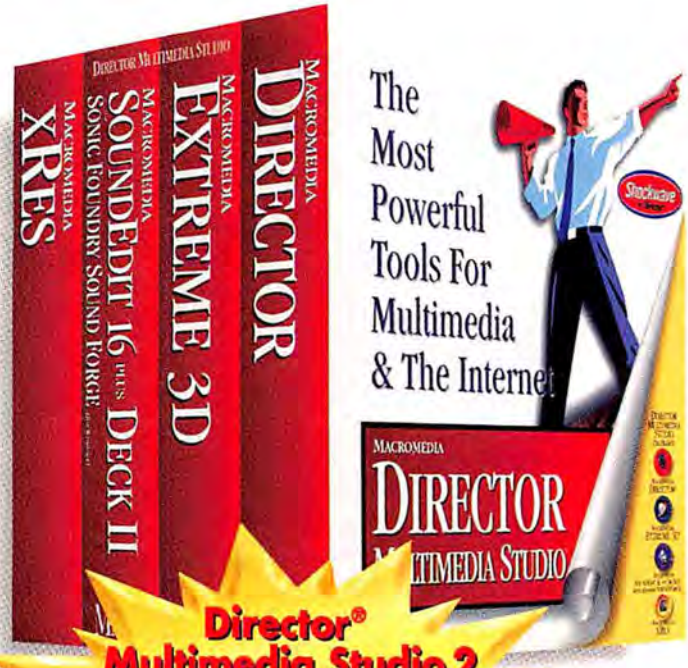

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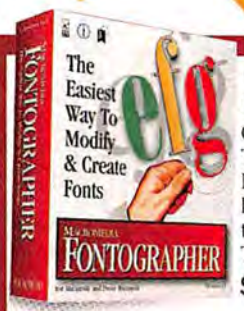

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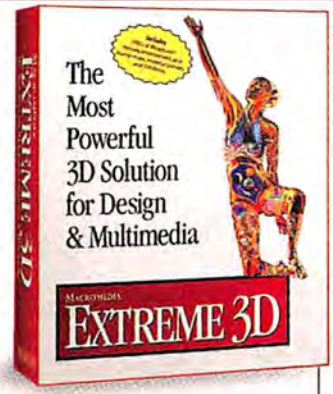

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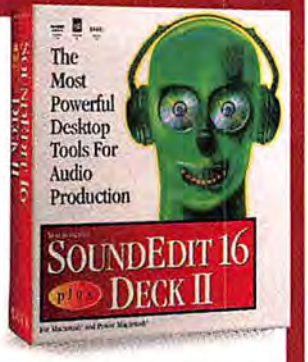

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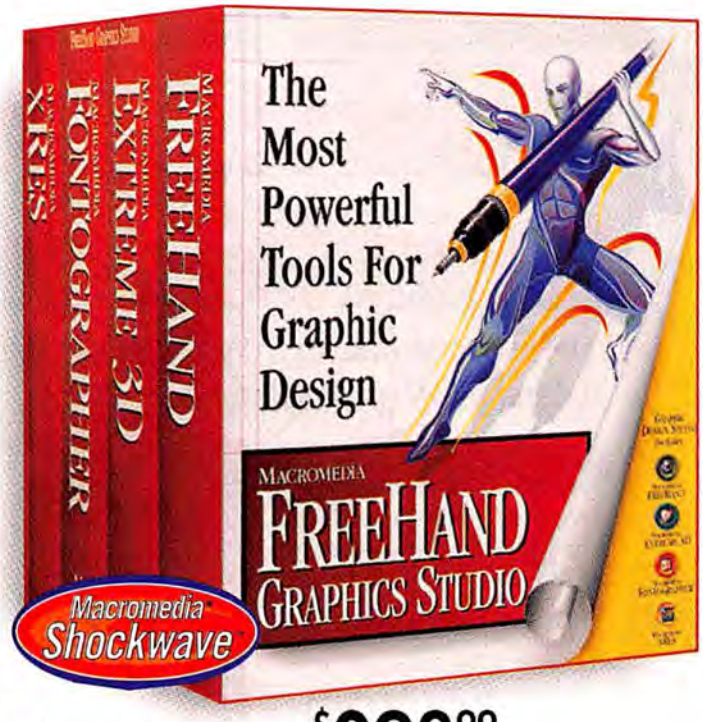

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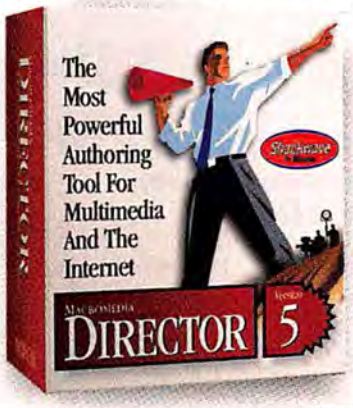

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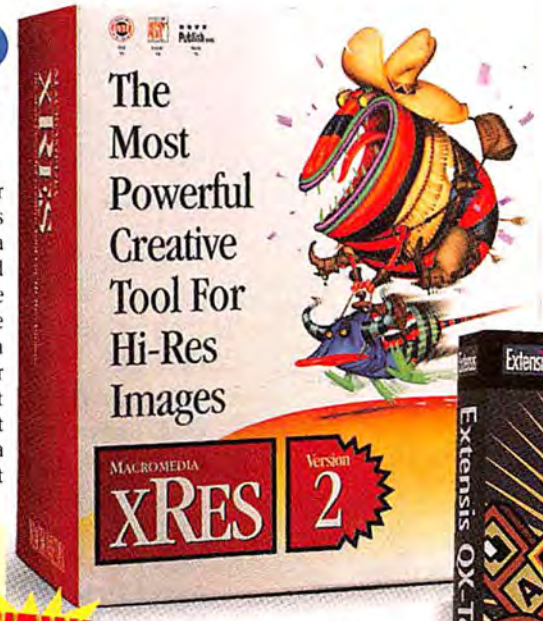

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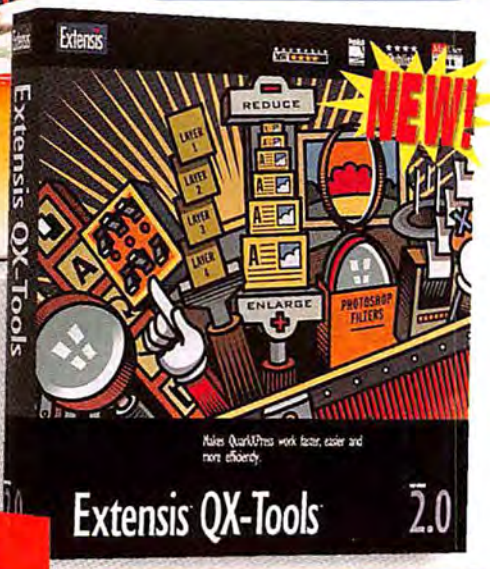

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PAPERPORT READY See page 25

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Meet Global Village's PowerPort PC Card series! Each includes GlobalFax™, and PC Card Enhancement software (Platinum™ modems include OCR software). Here are your choices:

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SoftWindows™ 3.0 for Power Macintosh® Upgrade Disk ..... $74.99 #79638
SoftWindows™ 1.0 for Performa® CD ..... $124.99 #70052
System Requirements: Performa™ System 7.0 System with 8MB RAM, 6MB disk space.
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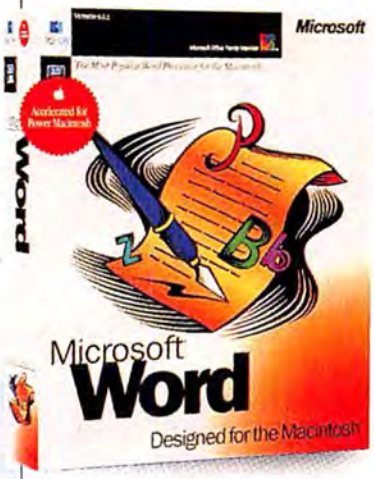

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PAPERPORT READY
See page 25 for more details

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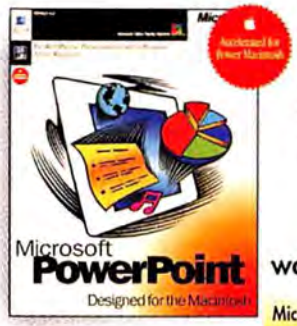

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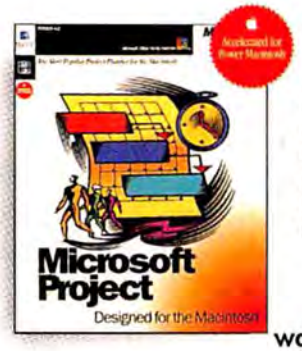

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Enjoy total control over your next project! Microsoft Project lets you organize your projects into manageable forms. You can create progress charts so you can stay on schedule and on target.

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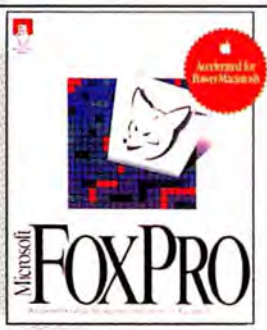

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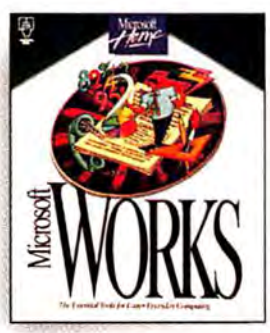

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Award-Winning Stylus Ink Jet Technology!

Output from the EPSON Stylus Pro is so sharp that it rivals photographs.

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- True Black laser quality text at 720 x 720dpi
- Prints up to 3ppm; 1ppm color
- Optional Adobe Postscript with Pantone Color Calibration (#77043)
- Photo Quality color
- Prints on plain paper, envelopes and Epson's premium coated glossy papers and transparencies

Epson Stylus Color Pro XL

For Big Brilliant Photo Quality Color Printing!

For accurate PMS color reproduction, there's an optional Adobe™ Postscript Level 2 software with Pantone Color Calibration. (#78139)

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Epson Stylus 1500 Ink Jet Printer $995.99 #79536

- 720 x 720dpi Photo Quality color printing with Microdot technology for smooth color gradations
- Print up to 12.5" x 18" full bleed in Photo Quality color
- Versatile paper tray for envelopes and more

Add These Epson Supplies to Your Order.

Paper

720dpi coated paper—LETTER *100 sheets*	$19.99 #74554
720dpi coated paper—11" x 17" *200 sheets* for Stylus Pro XL	59.99 #78700
720dpi coated paper—LEGAL *200 sheets*	34.99 #74552
720dpi super B size paper *100 sheets*	39.99 #80205
Iron-on transfer paper *10pk* 8 1/2" x 11" NEW	14.99 #82902

Ink Cartridges

Black ink cartridge for Stylus COLOR II	22.99 #74557
Black ink cartridge for Stylus Pro & Pro XL	15.99 #70747
Black ink cartridge for Stylus COLOR 500 NEW	22.99 #82905
Color ink cartridge for Stylus COLOR II	29.99 #74558
Color ink cartridge for Stylus Pro & Pro XL	28.99 #70746
Color ink cartridge for Stylus COLOR 500 NEW	29.99 #82906

Power Rips

Birmy power rip for Stylus Pro, *(Postscript option)* includes optional Adobe level II software, Pantone	219.99 #77043
Birmy power rip for Stylus Pro XL, *(Postscript option)* includes optional Adobe level II software, Pantone	249.99 #78139

Ethernet and LocalTalk Interfaces

Ethernet/Ethertalk Interface Card *(Stylus Color, Pro, Pro XL)*	399.99 #74559
LocalTalk Interface for LQ printers *(Mac)*	138.99 #68785

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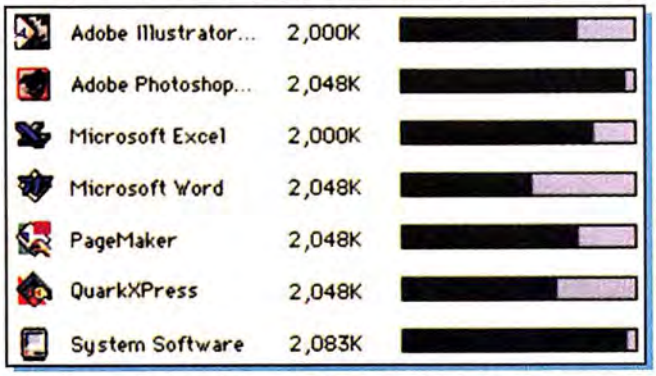
TRIPLE Your Memory for only $24.99

Imagine running more applications than ever before. Imagine never having to quit an application to free up memory again. And especially imagine up to TRIPLING your Macintosh computer's memory with a single mouse click! Now stop imagining. New RAM Doubler 2.0 has finally arrived. This miraculous memory-boosting utility works automatically whenever you use your Mac. So you can run memory-hungry desktop publishing, multimedia authoring and image editing programs without purchasing expensive extra megabytes of RAM. Keep multiple applications open simultaneously (no more time wasted quitting and reopening your programs). And reduce the memory use of your Power Mac applications. You can opt for flexible memory options, like double memory, triple memory and memory savings for Power Mac native applications. Plus, its new RAM compression is up to twice as fast as RAM Doubler 1.0. Order it today. And triple your productivity.

NEW VERSION!



RAM Doubler "fools" your Mac into thinking it has more RAM! The result? More application flexibility for you.

$24.99* #82525

RAM DOUBLER 2.0 Mac®

**After $25 mail-in rebate for owners of Ram Doubler 1.x Regular price $49.99*

Critics Corner

Awards won by RAM Doubler 1.0

MacUser Rate 3 3 3 3 1/2 April

Macworld 1996 World Class Award Winner

MacWEEK

1994 Mac Home Journal Readers' Choice

Mac Home

1992 BYTE Award of Merit

Macuser Editors' Choice Award 1994 Winner

MACWORLD MW

- **How it works:** RAM Doubler 2.0 uses unused memory from other applications not in use and compresses the least-recently used memory in RAM
- RAM Doubler 2.0 triples your Mac's memory so you can run more applications
- RAM Doubler 2's compression engine is up to twice as fast as the original RAM Doubler
- Includes a control panel with settings from File Mapping to Triple Memory for control over your RAM

Connectix

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- Create entertaining smooth animation—a "goovie" with literally one mouse click
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Smear, smudge, grow and shrink your favorite images with Kai's Power Goo. Your friends and family will be amazed at all you can do!

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Kai's Power Tools® 3 w/CPU Purchase	$99.99	#77218
Vector Effects w/CPU Purchase	99.99	#77220

Vector Effects CD
$128.99 #72401

Vector Effects™

Just pick an effect (like 3D extrusion, neon or shadow). Then apply it to your work using Vector Effects!

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You can easily apply stunning effects to both objects and text!

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Now you can create amazing digital imaging effects for your Web pages, annual reports, magazine covers and more! And you can see the results of your work immediately through its real-time previews. Just order Kai's Power Tools 3 today and start creating! It's that simple.

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- Easy-to-use gradient, texture and sphere generators for cool 3D text effects, backgrounds and illustrations
- The desktop's first texture animation engine, ideal for QuickTime or AVI movie backgrounds
- Quick results with graphic presets, advanced interfaces and huge real-time previews of every effect (even the famous Page Curl)

Easily create the coolest 3D sphere effects that'll make your work pop!

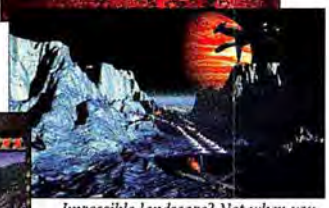
Create Stunning 3D Imaging with Bryce 2

Bryce™ 2 gives you total control over terrain, materials and atmosphere for the ultimate in rendered images. Choose from three sets of tools for creating objects, editing them and designing special effects. Preview your work from any angle, use a real-time 3D terrain editor, apply boolean rendering controls, import DXF models from 3D imaging programs and much more!

Create dramatic landscapes with real-time erosion and smoothing.

- Constantly updated "nano" previews
- Multiple light sources
- Lots of new primitives
- All-new user interface

New camera controls, render options and previews make Bryce 2.0's next-generation interface the perfect setting for creating beautiful 3D imaging.



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Bryce™ 2 Mac™/Power PC™

Convolver Mac®/Power PC™	$128.99	#68474
Final Effects AP™ CD Mac™/Power PC™	149.99	#80038
Power Photos I CD Mac™/Windows™	128.99	#78322
Power Photos II CD Mac™/Windows™	128.99	#74439
Power Photos III CD Mac™/Windows™	128.99	#78662
Power Photos IV CD Mac™/Windows™	128.99	#82044
Power Photos Starter Kit CD Mac™/Windows™ (includes sample images of Vol's 1,2,3)	29.99	#81125

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VIKING COMPONENTS MEMORY UPGRADE GUIDE

How to Order the RAM That's Exactly Right for Your Computer

If you use the handy charts below (and on the next two pages), choosing the right SIMMs and DIMMs for your machine is pretty easy.

Just follow these simple steps:

1. Locate your computer model in the first column of the chart. (The number in parentheses below your model name is the amount of RAM your computer originally came with.)
2. Choose your RAM upgrade by looking at the second column.
3. Then check the third column for the exact number and description of the SIMMs or DIMMs you'll need.
4. The fourth and fifth columns give you the item number and price for the SIMMs and DIMMs you've chosen.
5. Call today to order the SIMMs and DIMMs you want and you could have more memory installed in your computer by tomorrow.

What Exactly is VRAM and Why Do I Need It?

VRAM is Video RAM. Install more VRAM in your Mac™, and you'll see more colors on your monitor. Your reds will be brighter, your blues will range from royal to robin's egg and every shade in between.

Description:	Price	Order #
256K VRAM	$21	#55831
512K VRAM	$29	#60488
1MB VRAM DIMMs/112pin/64-bit	$59	#74332
2MB VRAM for Power Mac™9500 Model	$159	#74050

What is Cache Memory?

Cache memory allows your computer to quickly remember recently-written blocks of data. It can be thought of as a "post-written" system, rather than a "read-ahead" system. If you need the same information again, the cache memory can retrieve it faster than your disk!

Description:	Price	Order #
256K Cache - 7200, 8500	$99	#80335
256K Cache - 7500	$99	#81955
512K Cache - 7200, 7500	$199	#80336

MacMall's Top-Selling SIMMs & DIMMs

MacMall Recommends these Top Selling SIMMs for Your NEW Performa®

Size:	Speed/Description	Price	Order #
4MB	72 pin/32-bit/80ns SIMM.	$39	#4468
For Your NEW Apple® Macintosh® Performa® 631, 640, 5215, 6200, 6220, 6110CD, 6112CD, 6115CD, 6116CD, 6117CD or 6118CD			
8MB	72 pin/32-bit/80ns SIMM.	$79	#4177
For Your NEW Apple® Macintosh® Performa® 631, 640, 5215, 6200, 6220, 6110CD, 6112CD, 6115CD, 6116CD, 6117CD or 6118CD			
16MB	72 pin/32-bit/80ns SIMM.	$149	#65416
For Your NEW Apple® Macintosh® Performa® 631, 640, 5215, 6200, 6220, 6110CD, 6112CD, 6115CD, 6116CD, 6117CD or 6118CD			

MacMall Recommends these Top-Selling DIMMs for Your NEW Power Macintosh®

8MB	64-bit/70ns DIMM	$89	#72645
For Your NEW Apple® Power Macintosh® 7200, 7500, 7600, 8500 or 9500			
16MB	64-bit/70ns DIMM	$159	#72646
For Your NEW Apple® Power Macintosh® 7200, 7500, 7600, 8500 or 9500			
32MB	64-bit/70ns DIMM	$299	#72647
For Your NEW Apple® Power Macintosh® 7200, 7500, 7600, 8500 or 9500			

Macintosh® Quadra® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
Quadra® 605, 630 (4MB) *1 SIMM socket*	8MB	(1) 4MB SIMM (80ns)	$39	(1) #4468
	12MB	(1) 8MB SIMM (80ns)	$79	(1) #4177
	20MB	(1)16MB SIMM (80ns)	$159	(1) #67466
	36MB	(1)32MB SIMM (80ns)	$329	(1) #67467
Quadra® 610 (4MB) *2 SIMM sockets*	8MB	(1) 4MB SIMM (80ns)	$39	(1) #4468
	12MB	(1) 8MB SIMM (80ns)	$79	(1) #4177
	20MB	(1)16MB SIMM (80ns)	$149	(1) #65416
Quadra® 650, 800 (8MB) *4 SIMM sockets*	12MB	(1) 4MB SIMM (80ns)	$39	(1) #4468
	16MB	(1) 8MB SIMM (80ns)	$79	(1) #4177
	24MB	(1)16MB SIMM (80ns)	$149	(1) #65416
	40MB	(1)32MB SIMM (80ns)	$299	(1) #65417
Quadra® 660av, 840av (8MB) *8 SIMM sockets*	12MB	(1) 4MB SIMM (60ns)	$39	(1) #61203
	16MB	(1) 8MB SIMM (60ns)	$79	(1) #61205
	24MB	(1)16MB SIMM (60ns)	$169	(1) #62424
	40MB	(1)32MB SIMM (60ns)	$199	(1) #62425
Quadra® 900, 950 (4 or 8MB) *16 SIMM sockets*	20 or 24MB	(4) 4MB SIMM (80ns)	$45	(4) #2239
	36 or 40MB	(8) 4MB SIMM (80ns)	$45	(8) #2239
	52MB	(12) 4MB SIMM (80ns)	$45	(12) #2239
	64MB	(16) 4MB SIMM (80ns)	$45	(16) #2239

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Power Macintosh® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
Power Mac™ 6100, 7100, 8100 (8MB) *2 SIMM sockets (6100) 4 SIMM sockets (7100) 8 SIMM sockets (8100)*	16MB	(2) 4MB SIMM (80ns)	$39	(2) #4468
	24MB	(2) 8MB SIMM (80ns)	$79	(2) #4177
	40MB	(2) 16MB SIMM (80ns)	$149	(2) #65416
	72MB	(2) 32MB SIMM (80ns)	$299	(2) #65417
	136MB (71/8100)	(4) 32MB SIMM (80ns)	$299	(4) #65417
	264MB (8100)	(8) 32MB SIMM (80ns)	$299	(8) #65417
Power Mac™ 7200 (8MB) *4 DIMM sockets*	16MB	(2) 4MB DIMM (70ns)	$79	(2) #74639
	24MB	(2) 8MB DIMM (70ns)	$89	(2) #72645
	40MB	(2) 16MB DIMM (70ns)	$159	(2) #72646
	72MB	(2) 32MB DIMM (70ns)	$299	(2) #72647
Power Mac™ 7500, 7600, 8500 (16MB) *8 DIMM sockets*	24MB	(2) 4MB DIMM (70ns)	$79	(2) #74639
	32MB	(2) 8MB DIMM (70ns)	$89	(2) #72645
	48MB	(2) 16MB DIMM (70ns)	$159	(2) #72646
	80MB	(2) 32MB DIMM (70ns)	$299	(2) #72647
Power Mac™ 9500 (16MB) *12 DIMM sockets*	20MB	(1) 4MB DIMM (70ns)	$79	(1) #74639
	32MB	(2) 8MB DIMM (70ns)	$89	(2) #72645
	48MB	(2) 16MB DIMM (70ns)	$159	(2) #72646
	80MB	(2) 32MB DIMM (70ns)	$299	(2) #72647
	112MB	(12) 8MB DIMM (70ns)	$89	(12) #72645
	144MB	(2) 64MB DIMM (70ns)	$589	(2) #72648
	208MB	(12)16MB DIMM (70ns)	$159	(12) #72646
	400MB	(12)32MB DIMM (70ns)	$299	(12) #72647
	768MB	(12)64MB DIMM (70ns)	$589	(12) #72648

Macintosh® PowerBook® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
PowerBook® 140, 145, 170 (2 or 4MB) *1 Memory Slot*	6MB	(1) 4MB Module (80ns)	$189	(1)#61751
	8MB	(1) 6MB Module (80ns)	$279	(1)#55471
PowerBook® 150 (4 or 8MB) *1 Memory Slot*	8 or 12MB	(1) 4MB Module (80ns)	$209	(1)#68678*
	12 or 16MB	(1) 8MB Module (80ns)	$369	(1)#68679*
	16 or 20MB	(1)12MB Module (80ns)	$579	(1)#68680*
PowerBook® 160, 165, 180 (4MB) *1 Memory Slot*	8MB	(1) 4MB Module (80ns)	$189	(1)#60773
	10MB	(1) 6MB Module (80ns)	$279	(1)#60774
	12MB	(1) 8MB Module (80ns)	$359	(1)#60775
	14MB	(1)10MB Module (80ns)	$429	(1)#60776
PowerBook® 165c, 180c (4MB) *1 Memory Slot*	8MB	(1) 4MB Module (80ns)	$199	(1)#61383
	10MB	(1) 6MB Module (80ns)	$279	(1)#61384
	12MB	(1) 8MB Module (80ns)	$359	(1)#61385
	14MB	(1)10MB Module (80ns)	$429	(1)#61386

Macintosh® PowerBook® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
PowerBook® Duo 210, 230, 250, 270, 270c, 280, 280c, 2300c (4MB) *1 Memory Slot*	8MB	(1) 4MB Module (80ns)	$149	(1)#61619
	12MB	(1) 8MB Module (80ns)	$199	(1)#61034
	16MB	(1)12MB Module (80ns)	$239	(1)#60782
PowerBook® 520, 520c, 540, 540c (4MB) *1 Memory Slot*	8MB	(1)4MB Module (80ns)	$89	(1)#64806
	12MB	(1) 8MB Module (80ns)	$129	(1)#64807
	20MB	(1)16MB Module (80ns)	$239	(1)#64808
	36MB	(1)32MB Module (80ns)	$399	(1)#64809
PowerBook® 190 (4 or 8MB) *1 Memory Slot*	8 or 12MB	(1) 4MB Module (80ns)	$89	(1)#77413
	12 or 16MB	(1) 8MB Module (80ns)	$129	(1)#77414
	20 or 24MB	(1)16MB Module (80ns)	$259	(1)#77415
	36 or 40MB	(1)32MB Module (80ns)	$489	(1)#77416
PowerBook Duo® 2300 (8 or 20MB) *1 Memory Slot*	16 or 28MB	(1) 8MB Module (70ns)	$139	(1)#78862
	24 or 36 MB	(1)16MB Module (70ns)	$239	(1)#78863
	32 or 44MB	(1)24MB Module (70ns)	$359	(1)#78864
	40 or 52MB	(1)32MB Module (70ns)	$459	(1)#78865
	48 or 60MB	(1)40MB Module (70ns)	$599	(1)#78866
	56 or 68MB	(1)48MB Module (70ns)	$699	(1)#78867
PowerBook® 5300 (8MB) *1 Memory Slot*	12MB	(1) 4MB Module (80ns)	$79	(1)#74759
	16MB	(1) 8MB Module (80ns)	$139	(1)#74760
	20MB	(1)12MB Module (80ns)	$169	(1)#74761
	24MB	(1)16MB Module (80ns)	$219	(1)#74762
	40MB	(1)32MB Module (80ns)	$399	(1)#74763
	56MB	(1)48MB Module (80ns)	$599	(1)#74764

*Includes Adapter Kit

Power Computing® Mac™OS Compatibles

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
Power 100, 120 (8MB) *6 SIMM sockets*	16MB	(2) 4MB SIMM (80ns)	$39	(2) #4468
	24MB	(2) 8MB SIMM (80ns)	$79	(2) #4177
	40MB	(2) 16MB SIMM (80ns)	$149	(2) #65416
	72MB	(2) 32MB SIMM (80ns)	$299	(2) #65417
	136MB	(4) 32MB SIMM (80ns)	$299	(4) #65417
	200MB	(6) 32MB SIMM (80ns)	$299	(6) #65417
PowerWave 604/120, 604/132, 604/150, 7200 (16MB) *8 DIMM sockets*	24MB	(2) 4MB DIMM (70ns)	$79	(2) #74639
	32MB	(2) 8MB DIMM (70ns)	$89	(2) #72645
	48MB	(2) 16MB DIMM (70ns)	$159	(2) #72646
	80MB	(2) 32MB DIMM (70ns)	$299	(2) #72647
	112MB	(6) 16MB DIMM (70ns)	$159	(6) #72646
	144MB	(4) 32MB DIMM (70ns)	$299	(4) #72647
	208MB	(6) 32MB DIMM (70ns)	$299	(6) #72647
	272MB	(4) 64MB DIMM (70ns)	$589	(4) #72648
	400MB	(6) 64MB DIMM (70ns)	$589	(6) #72648
	512MB	(8) 64MB DIMM (70ns)	$589	(8) #72648
PowerTower 166, 180 *4 SIMM sockets*	32MB	(2) 8MB SIMM (60ns)	$99	(2) #82264
	48MB	(2) 16MB SIMM (60ns)	$179	(2) #82265
	64MB	(4) 16MB SIMM (60ns)	$179	(4) #82265
	80MB	(2) 32MB SIMM (60ns)	$329	(2) #82266
	128MB	(4) 32MB SIMM (60ns)	$329	(4) #82266
	144MB	(2) 64MB SIMM (60ns)	$699	(2) #82267
	256MB	(4) 64MB SIMM (60ns)	$699	(4) #82267

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Macintosh® SE Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/ Order #
SE/30 (1MB) 8 SIMM sockets	5MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	8MB	(8) 1MB SIMM (80ns)	$19	(8)#2224
	17MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
	20MB	(4) 4MB SIMM & (1) 1MB SIMM (80ns)	$45 $19	(4)#2239 (1)#2224
	32MB	(8) 4MB SIMM (80ns)	$45	(8)#2239

Macintosh® Classic Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/ Order #
Classic II (4MB) 2 SIMM sockets	6MB	(2) 2MB SIMM (80ns)	$29	(2)#60274
	10MB	(2) 4MB SIMM (80ns)	$45	(2)#2239
Color Classic (4MB) 2 SIMM sockets	6MB	(2) 1MB SIMM (80ns)	$19	(2)#2224
	8MB	(2) 2MB SIMM (80ns)	$29	(2)#60274
	10MB	(2) 4MB SIMM (80ns)	$45	(2)#2239

Macintosh® LC Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/ Order #
LC (2MB)	4 or 6MB	(2) 1MB SIMM (80ns)	$19	(2)#2224
LC II (4MB)	6 or 8MB	(2) 2MB SIMM (80ns)	$29	(2)#60274
2 SIMM sockets	8 or 10MB	(2) 4MB SIMM (80ns)	$45	(2)#2239
LC III,	8MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
LC475-630	12MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
(4MB)	20MB	(1)16MB SIMM (80ns)	$159	(1)#67466

Macintosh® Centris® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/ Order #
Centris® 610	8MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
(4MB)	12MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
4 SIMM sockets	20MB	(1)16MB SIMM (80ns)	$149	(1)#65416
Centris® 650, 800	8 or 12MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
(4MB or 8MB)	12 or 16MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
4 SIMM sockets	20 or 24MB	(1)16MB SIMM (80ns)	$149	(1)#65416

Apple® Workgroup Servers

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/ Order #
Workgroup Server 60, 80 (8MB) 4 SIMM sockets	12MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
	16MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
	24MB	(1)16MB SIMM (80ns)	$149	(1)#65416
	40MB	(1)32MB SIMM (80ns)	$299	(1)#65417
Workgroup Server 6150 (8MB) 2 SIMM sockets	16MB	(2) 4MB SIMM (80ns)	$39	(1)#4468
	24MB	(2) 8MB SIMM (80ns)	$79	(1)#4177
	40MB	(2)16MB SIMM (80ns)	$149	(1)#65416
Workgroup Server 8150, 9150 (8MB) 8 SIMM sockets	16MB	(2) 4MB SIMM (80ns)	$39	(2)#4468
	24MB	(2) 8MB SIMM (80ns)	$79	(2)#4177
	40MB	(8) 4MB SIMM (80ns)	$39	(8)#4468
	72MB	(8) 8MB SIMM (80ns)	$79	(8)#4177
	136MB	(8)16MB SIMM (80ns)	$149	(8)#65416
	264MB	(8)32MB SIMM (80ns)	$299	(8)#65417
Workgroup Server 95 (16MB) 16 SIMM sockets	16MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
	24MB	(12)8MB SIMM (80ns)	$45	(12)#2239
	40MB	(16)4MB SIMM (80ns)	$45	(16)#2239

Macintosh® II Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
II, IIx (1MB) 8 SIMM sockets	5MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	8MB	(8) 1MB SIMM (80ns)	$19	(8)#2224
II cx (1MB) 8 SIMM sockets	5MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	8MB	(8) 1MB SIMM (80ns)	$19	(8)#2224
	17MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
	20MB	(4) 4MB SIMM & (4) 1MB SIMM (80ns)	$45 $19	(4)#2239 (4)#2224
	32MB	(8) 4MB SIMM (80ns)	$45	(4)#2239
II ci (1MB) 8 SIMM sockets	5MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	8MB	(8) 1MB SIMM (80ns)	$19	(8)#2224
	9MB	(4) 2MB SIMM (80ns)	$29	(4)#60274
	12MB	(4) 2MB SIMM & (4) 1MB SIMM (80ns)	$29 $19	(4)#60274 (4)#2224
	17MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
	20MB	(4) 4MB SIMM & (4) 1MB SIMM (80ns)	$45 $19	(4)#2239 (4)#2224
	24MB	(4) 4MB SIMM & (4) 2MB SIMM (80ns)	$45 $29	(4)#2239 (4)#60274
	32MB	(8) 4MB SIMM (80ns)	$45	(8)#2239
II si (1MB) 4 SIMM sockets	5MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	9MB	(4) 2MB SIMM (80ns)	$29	(4)#60274
	17MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
II vx, IIvi (4MB) 4 SIMM sockets	8MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	12MB	(4) 2MB SIMM (80ns)	$29	(4)#60274
	20MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
II fx (4MB) 8 SIMM sockets	8MB	(1) 4MB SIMM (70ns)	$59	(1)#74620
	32MB	(8) 4MB SIMM (70ns)	$59	(8)#74620
Also Available: II, IIx	4MB	8-bit 70ns SIMM	$59	#74621

Macintosh® Performa® Series

Model:	To Upgrade RAM to:	You Should Order	Price Each: (Not Total $)	Qty/Order #
Performa® 200 (4MB) 2 SIMM sockets	6MB	(8) 4MB SIMM (80ns)	$29	(2)#60274
	12MB	(2) 4MB SIMM (80ns)	$45	(2)#2239
Performa® 400-430 (4MB) 2 SIMM sockets	6MB	(2) 1MB SIMM (80ns)	$19	(2)#2224
	8MB	(2) 2MB SIMM (80ns)	$29	(2)#60274
	12MB	(2) 4MB SIMM (80ns)	$45	(2)#2239
Performa® 600 (4MB) 4 SIMM sockets	8MB	(4) 1MB SIMM (80ns)	$19	(4)#2224
	12MB	(4) 2MB SIMM (80ns)	$29	(4)#60274
	20MB	(4) 4MB SIMM (80ns)	$45	(4)#2239
Performa®450 575, 630-640 (4MB) 1 SIMM socket	8MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
	12MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
	20MB	(1)16MB SIMM (80ns)	$159	(1)#67466
Performa®5215- 6300 (4 or 8MB) 2 SIMM sockets	8 or 12MB	(1) 4MB SIMM (80ns)	$39	(1)#4468
	12 or 16MB	(1) 8MB SIMM (80ns)	$79	(1)#4177
	20 or 24MB	(1)16MB SIMM (80ns)	$149	(1)#65416
Performa® 6110CD-6118CD (8MB) 2 SIMM sockets	16MB	(2) 4MB SIMM (80ns)	$39	(2)#4468
	24MB	(2) 8MB SIMM (80ns)	$79	(2)#4177
	40MB	(2)16MB SIMM (80ns)	$149	(2)#65416

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NEW Mac OS

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Want high-end MacOS performance, without the high price? Then Umax's new SUPERMacs are for you. And MacMall is the place to get them, fast. In fact, with our FedEx Priority Overnight shipping, if you order by 11pm EST, we can have your new SUPERmac to you by 10:30am the next day.

NEW SUPERmac J700 and S900 MacOS Compatibles. . .two of MacUser Magazine's Highest-Rated Machines!

Only UMAX Gives You All This...

Critics Corner

score card
MacWEEK ◆◆◆◆
June 1996

MacUser RATED
JULY 1996

"Speeds to the top of the Mac™ Pack!"
—MacWorld, May '96

All Models Feature Interleaved Memory

16MB or 32MB of interleaved memory for fast memory access and best system performance. Others require the purchase of additional DIMMs to implement memory interleaved.

Exclusive Advanced Scalable Processor Design

UMAX's exclusive ASPD provides easy upgradeability to dual processors or for higher speed processors as they become available. This modular configuration costs less and is far more flexible. With the addition of a second processor card for the 5900, programs like Photoshop could potentially increase performance up to 80%!

Exclusive PCI-to-PCI Bridges

The S900 models also have up to 6 PCI slots. They're also the first to enable burst communication between those slots. UMAX's exclusive PCI-to-PCI bridge design enables direct communication between all PCI cards. So you enjoy increased performance from all the cards, no matter which slot they're in! This also increases expandability and makes configuration easy.

E100 I/O & Networking Card

To increase performance even further, UMAX offers the ultimate combination upgrade that gives you both Ultra-Wide SCSI and 100Base-T on one easy-to-install PCI card. The 100Base-T gives you ten times the data transfer over networks than the speed of standard 10Base-T connections. Ultra-Wide SCSI provides 16-bit wide data access at rates up to 40M per second. That is four times the speed of regular SCSI!

Models Targeted to Your Needs

The S900 models are designed with multimedia and graphic arts in mind. This ground-breaking computer gives you true workstation performance on a MacOS platform. The J700 models are the business machine of tomorrow. Designed to grow with you and your business, they offer price and performance in a convenient tower case design.

Bundled Software for S900

- Apple Macintosh System 7.5
- Casady & Greene Conflict Catcher
- Asante Net Doubler
- FWB CD-ROM Tool kit™
- FWB Hard Drive Tool kit™

Bundled Software for J700

WHAT'S REALLY COOL ABOUT THE SUPERMAC J700?

- *Its 150MHz "cruising" speed is ideal for running your mid-range business applications expandable up to 200MHz*
- *The speedy 8X CD-ROM drive gives you access to all the latest business software titles*
- *A hefty 2GB hard drive gives you plenty of storage space for important business presentations, databases and more*
- *You can upgrade your RAM in a flash, thanks to its easily accessible slots*
- *The unique case design gives you the power you want in a space saving model*
- *4 useable PCI slots give you more flexible expansion options so the machine can grow as your business grows (one slot used for graphics card)*

FreeHand 5.5 FREE with your MacOS Compatible Purchase!

Compatibles

What's Really Cool about the SUPERMac S900?

- *NOW 200 MHz or Dual 180MHz—ideal for your pre-press, multimedia and professional graphics work*
- *The speedy 6.7X or 8X CD-ROM drive gives you access to the latest multimedia titles without the wait*
- *A hefty 2GB hard drive gives you plenty of storage space for graphics, huge applications and more*
- *When you need more speed, upgrade your processors in a flash, thanks to its exclusive ASPD technology*
- *Easily expand your system using the latest PCI technology (includes a generous 6 slots, one used for graphics card)*

UMAX®

as low as $2995

FREE Zip Drive!*
w/purchase of Desktop CPU
*Price after Epson mail-in rebate and MacMall mail-in rebate. Limit 4 per Address

200 MHz

The S900 is the high end machine for all of your graphic design projects.

FreeHand 5.5 FREE!

Purchase your MacOS Compatible from MacMall and grab FreeHand 5.5 absolutely FREE! That's a $400 value!

You must order your CPU from MacMall between September 1 and September 30, 1996. See page 9 for details. Supplies are limited.

MacMall Place Your Order 24 Hours a Day 1•800•217•9498

Choose the SUPERmac that's right for you!

Model	NEW! J700L	S900D	S900L	NEW! S900L	NEW! S900L	NEW! S900L
Clock Speed	150MHz	150MHz	150MHz	180MHz	180MHz	200MHz
Processor	604	604	604	604e	604e/Dual	604e
Cache	256K L2	512K L2	512K L2	512K L2	512K L2	512K L2
Floppy Drive	Internal 1.44MB Apple SuperDrive® floppy disk drive					
Expansion Bays	3 Internal Bays	5 Internal Bays				
Networking/Ports	2 ADB Ports; 2 High Speed Serial Ports; 10Base-T Ethernet; UltraWide SCSI and 100Base-T (Optional)					
Expansion Option	Four useable PCI expansion slots	Six PCI expansion slots; ASPD for User-Installable 2nd Processor				
Keyboard	Extended Keyboard and Mouse					
Display	IMS Twin Turbo 128-bit 2MB VRAM PCI displayboard	None	IMS Twin Turbo 128-bit 4MB VRAM PCI displayboard			
Memory	16MB	16MB	16MB	32MB	32MB	32MB
Hard Drive	2GB	None	2GB	2GB	2GB	2GB
CD-ROM Drive	Internal 8X	Internal 6.7X	Internal 6.7X	Internal 8X	Internal 8X	Internal 8X
MacMall Price	$2995	$2995	$3695	$3995	$4695	$4295
Order Number	#82882	#80965	#82883	#82878	#82880	#82891

Extended Performance UltraWide SCSI III & 100Base-T Card
$495 #80966

Advanced Scalable Processor Design Card-604/150
$795 #80967

Primary Processor Cards
604e/180 $895 #83272
604e/200 $1195 #83273

MagInnovision 17" Color Trinitron® Display
- ✓ Supports standard VGA to 1024 X 768
- ✓ Cross Platform compatible
- ✓ Dark-tinted, anti-glare screen

$749.99 #82417

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PowerCenter Prices Slashed up to $900!

Now you can own a high-performance PowerCenter computer for less! A little over one month ago, the PowerCenter 150 shown below (#80619) was priced at $2995! Today you can grab the exact machine for $2095! That's a $900 savings for you. And what's more, the PowerCenter 132MHz has also been reduced $600! Order your PowerCenter 132 or 150MHz today. And save big on one of the fastest & most affordable Mac Compatibles around.

What is Really Cool about the Power Computing Power Center?

- ✔ 132 or 150MHz PowerPC 604 RISC processor with integrated floating-point unit and 32K on-chip cache
- ✔ 16MB RAM, 1GB hard drive
- ✔ 512K Level 2 Cache, 3 PCI slots, Desktop enclosure
- ✔ 105-key ADB keyboard and ergonomic ADB mouse
- ✔ 1MB VRAM, 4X CD-ROM drive, 16-bit stereo sound
- ✔ Includes HUGE software bundle worth up to $1200

PowerComputing

PowerCenter 132
132MHz Processor
16MB RAM
1GB Hard Drive
4xCD-ROM Drive
512K L2 Cache
$1895 #83786
(Or lease for $76 per month)

PowerCenter 150
150MHz Processor
16MB RAM
1GB Hard Drive
4xCD-ROM Drive
512K L2 cache
$2095 #83787
(Or lease for $84 per month)

150MHz Reduced $900! Was $2995 Now $2095

150 MHz

FREE Zip Drive!*
w/purchase of Desktop CPU
*Price after Epson mail-in rebate and MacMall mail-in rebate.
Limit 4 per Address

Monitor sold separately

132MHz Reduced $600! Was $2495 Now $1895

The Results
Here is what MacWorld Labs concluded about

	Overall Score	CPU-Intensive
PowerTower 180	6.4	6.7
PowerTower 166	6.1	6.3
PowerCenter150	5.6	5.9
PowerCenter 132	5.0	5.4
PowerCenter 120	4.6	5.0

Best result in test. Longer bars are better. Results are in times as fast as a Centris 650 (Centris 650=1.0). Products are listed in decreasing order of overall performance.
MacWorld Labs tests several functions in 8 key applications plus the finder to determine real-world performance for the 3 critical performance areas faced by most users.
—See MacWorld, July, 1996 for more information

Critics Corner

"For the rest of us who dream of a racing machine, but have to settle for a more practical vehicle, Power Computing offers the PowerCenter line of desktop Macs..."
—MacWorld, July 1996

"The PowerTower series offers the most excitement thanks to ground-breaking 166 and 180MHz speeds. And the excitement is warranted: the speed advantage is tangible."
—MacWorld, July 1996

MACWORLD MW ★★★★

PowerComputing

Performance and price combine to make the PowerCenter the most sensible choice for businesses as well as for midrange publishing and graphics use.

FASTEST Overnight Delivery Call by 11:00 pm EST for Delivery by 10:30 am the Next Day via FedEx

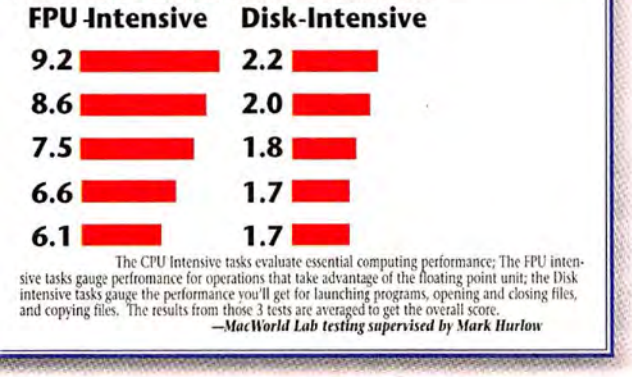
FreeHand 5.5 FREE with your Mac-OS Compatible Purchase!

The PowerTower is designed for high-performance users like image editors, programmers, media creators and color publishers.

Shown w/optional internal Zip drive. Monitor sold separately.

THE POWER COMPUTING POWER TOWER!

Are In!
the PowerCenter and the PowerTower



The CPU Intensive tasks evaluate essential computing performance; The FPU intensive tasks gauge perfromance for operations that take advantage of the floating point unit; the Disk intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files. The results from those 3 tests are averaged to get the overall score.
—MacWorld Lab testing supervised by Mark Hurlow

PowerComputing

There's fast computers. And then there's the Power Computing PowerTower. It's armed with either a 200, 180MHz or 166MHz PowerPC processor. It'll make short work of your graphics, multimedia and image editing tasks. Plus, it's fully loaded with 16MB of RAM, a 2GB hard drive and 2MB of onboard VRAM. Order yours today.

What is Really Cool about the Power Computing Power Tower?

- ✔ 200MHz, 180MHz or 166MHz PowerPC (604e or 604) RISC processor
- ✔ Upgradeable CPU daughter card
- ✔ A standard 16MB of RAM and a fast 2GB AV hard drive
- ✔ 4X or 8X CD-ROM drive
- ✔ 2MB of onboard VRAM
- ✔ 512K Level 2 Cache, 3 PCI slots
- ✔ Includes 105 key ADB keyboard, ergonomic ADB mouse and a HUGE software bundle

FreeHand 5.5 FREE!

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You must order your CPU from MacMall by September 30, 1996.
See page 9 for details.
Supplies are limited.

PowerTower 200e
200MHz 604e Processor
16MB RAM
2GB Hard Drive
8x CD-ROM Drive
512K L2 cache
NEW PRODUCT!
$3595 #83791
(Or lease for $144 per month)

PowerTower 180e
180MHz 604e Processor
16MB RAM
2GB Hard Drive
8x CD-ROM Drive
512K L2 cache
NEW PRODUCT!
$3295 #83790
(Or lease for $132 per month)

PowerTower 180
180MHz Processor
16MB RAM
2GB Hard Drive
4x CD-ROM Drive
512K L2 cache
$3095 #83789
(Or lease for $124 per month)

PowerTower 166
166MHz Processor
16MB RAM
2GB Hard Drive
4x CD-ROM Drive
512K L2 cache
$2895 #83788
(Or lease for $116 per month)

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Fastest MacOS

PowerComputing PowerTower Pro

"Let's get right to the point: Power Computing's new PowerTower Pros are smoking hot machines. They scream. If you're looking for speed, don't look any further."

—MacUser, September 1996

The PowerTower Pro is definitely a professional system! You can blas through your projects with its 16MB of RAM, 2GB hard drive and your choice of a blazing-fast 180, 200 or 225MHz PowerPC 604e Processor. Enjoy smooth real-time video playback acceleration and super-quick screen redraws with its built-in IMS Twin Turbo 128-bit Graphics Accelerator. Plus, you get a total of 9 Drive Bays, 6 PCI slots, dual processor support and CPU upgradeability. It also includes built-in Networking, an 8x speed drive and built-in 16-bit stereo. You even get Speed Doubler bundled with it! And if you order now, MacMall will even throw in FreeHand 5.5, absolutely FREE!

Critics Corner

"Hang onto your hat...New PowerTower Pro redefines speed."
—MacWorld, September 1996

"Power leapfrogs Apple—and everyone else—with the fastest ever desktop computer."
—MacUser, September 1996

MACWORLD MW ★★★★

MacUser RATED

PowerTower Pro FEATURES:

- ✔ 225MHz/ 200MHz/ 180MHz PowerPC 604e Processor
- ✔ 16MB RAM Upgradeable to 1GB (Interleaved memory)
- ✔ 6 PCI Slots
- ✔ Upgradeable CPU
- ✔ 9 Drive Bays
- ✔ Up to 1GB Memory
- ✔ Dual Processor Support
- ✔ Dual SCSI, Fast Internal 10MB/sec.
- ✔ 8x CD-ROM Drive
- ✔ 8MB 128-bit Graphics Accelerator
- ✔ 1MB Level 2 cache

The Results Are In!

Here is what MacUser Labs concluded about the PowerTower Pro

	Processor	Floating Point	Disk Mix	Publishing	Graphics	Graphics Pub.	CD-ROM Mix
PowerTower Pro 225	48.2	49.0	41.7	21.9	141.0	90.0	109.6
PowerTower Pro 200	46.5	44.1	40.5	21.6	140.7	90.3	110.7
PowerTower Pro 180	42.1	39.4	42.5	21.4	137.1	86.2	115.0

MacUser's MacBench 3.0 tests subsystem-level speed on tasks based on typical usage of popular application software. MacBench scores are relative to those of an Apple Power Mac 6100/60 with an internal 250MB hard drive. Power Mac 6100=10.0.
—MacUser Benchmark Testing, September 1996

FreeHand 5.5 FREE!

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You must order your CPU from MacMall by September 30, 1996. See page 9 for details. Supplies are limited.

Accessories for your PowerTower Pro!

Internal Iomega Zip Drive .....$143.99 #77651
Internal Iomega Jaz Drive .....$393.99 #83611
External v.34 28.8 Modem .....$94.99 #78149

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System Ever!

225 MHz

PowerTower Pro 200
200MHz Processor
16MB RAM
2GB Hard Drive
8x CD-ROM Drive
1MB L2 cache
8MB VRAM
$4495 #83793
(Or lease for $180 per month)

PowerTower Pro 225
225MHz Processor
16MB RAM
2GB Hard Drive
8x CD-ROM Drive
1MB L2 cache
8MB VRAM
$4995 #83794
(Or lease for $200 per month)

PowerTower Pro 180
180MHz Processor
16MB RAM
2GB Hard Drive
8x CD-ROM Drive
1MB L2 Cache
8MB VRAM
$4195
#83792
(Or lease for $168 per month)

Need A Monitor?
Portrait Display Pivot 1700 .28dp Monitor
$949.99* #72477

*Price Reflects a $100 Mail-in Rebate from Portrait Display. Rebate on purchase of Pivot 1700 with any MacOS compatible. Price before rebate is $1049.99

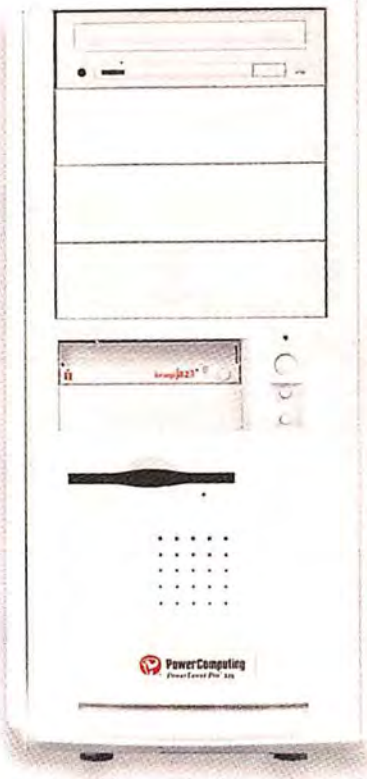
A FISTFUL OF MEMORY
Specially Chosen for Your NEW PowerTower Pro!

8MB DIMMS for PowerTower/ PowerTower Pro . . $99 #82264
16MB DIMMS for PowerTower/ PowerTower Pro . . 179 #82265
32MB DIMMS for PowerTower/ PowerTower Pro . . 299 #82266
64MB DIMMS for PowerTower/ PowerTower Pro . . 699 #82267
Installation . . . . . $30 #2214

256K cache card $249.99 #77574
512K cache card $349.99 #77575

FREE Zip Drive!*
w/purchase of Desktop CPU
*Price after Epson mail-in rebate and MacMall mail-in rebate.
Limit 4 per Address

The PowerTower Pro comes equipped with an IMS TwinTurbo accelerated graphics adapter with an updated driver that significantly boosts speed.



Monitor sold separately. Shown w/ optional internal Jaz drive.

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ADESSO Keyboards Designed with Your Comfort in Mind

NUForm w/Touch Pad
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Unrivaled ergonomic comfort and value.

NUForm with traditional, flat design offers the comfort of an ergonomic keyboard at a fraction of the cost. Perfect for home or office, NUForm features a ***split-key ergonomic layout*** with dual space bars, extra-deep wrist support, ergonomically-placed numeric and cursor keypads, and an optional built-in TouchPad conveniently located below the space bars.

TruForm Ergonomic Keyboard with Pointer
$89.99 #71990

Superior ergonomic comfort and precision for intensive input.

If you're a touch typist or spend a lot of time at the keyboard, TruForm offers greater typing comfort and ease. Its unique contoured design, split-key layout and adjustable wrist-support positions arms and wrists to alleviate stress and fatigue and increase typing comfort.

TruForm Ergonomic Keyboard (w/out Pointer)	$81.99	#71989
NUForm-basic	59.99	#81835
NUForm with pointer	69.99	#81836
PowerMouse 2-button mouse (PowerMac™ compatible)	19.99	#66709
ProPoint Extended Keyboard (ThinkPad Style Pointer)	59.99	#71929

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Mouse•in•a•Box
Need only one click, one button? Here's the best Macintosh® replacement mouse for your money. Mouse•in•a•Box is a one-button mouse featuring Kensington's award-winning design.
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Thinking Mouse
Thinking mouse was $89*. But thanks to its $20 instant rebate, it's been reduced to $69*!
It includes a unique 4-button design and high-performance software (you'll execute commands with a single click).
$69.99 #66745

Kensington Mouse
It's the most comfortable mouse ever! Kensington combines a natural shape with 2 oversized buttons. Easy-to-use software simplifies tasks like double-clicking, button locking and more! $58.99 #75079
MW EDITORS' CHOICE
MacWEEK ◆◆◆◆

Turbo Mouse 5.0
Kensington's sleek new 4-button design lets you maximize the performance of your trackball. You can use its software to "fine tune" it to your work habits. And its exclusive pop-up menus are the ultimate time saver.
$104.99 #77991
MACWORLD

8-Ball Track Ball for Turbo Mouse $9.99 #74443

5 YEAR WARRANTY
All Kensington Input Devices come with the Kensington Satisfaction Guarantee which includes: 5-Year Warranty, Toll-Free Technical Support and a 90-Day No Risk Trial.

KENSINGTON

MacALLY™ Peripherals

- Best third-party products available on the market
- Direct access to their web site at http://www.macally.com for more information and technical support
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Wow! Grab this 105-key keyboard for only
$59.99 #69554

Enjoy arcade-style game action with this joystick!
NEW LOW PRICE
$42.99 #69555

2-Button Track Ball	$39.99	#69558
Enhanced 97-Key Keyboard	$48.99	#69557
Single-Button Mouse	$21.99	#69556
2.5 Button Lady Bug Mouse	$24.99	#69560
2.5 Button Flag Mouse	$24.99	#77084
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Navigating is as easy as touching your fingertip to a screen! The GlidePoint delivers the most natural-feeling input device performance ever!

Order it today. It'll change the way you write, draw and control your cursor.

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- Largest touch surface available
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- Typewriter-style layout for easy composing of all your documents
- Number keypad for fast data entry on your spreadsheets
- Cursor-control keys (your hands never leave the keyboard)

Apple® Extended Keyboard II
$154.99 #3411

- 15 built-in Macro function keys
- Superior quality with comfortable typing
- Numeric keypad for number-intensive programs

Apple® Desktop Bus™ Mouse II	$76.99	#61094
Apple® GeoPort Adapter (Power Macintosh)	$124.99	#67915

Arriva™ *Value-Priced Arriva Easy Touch Extended Keyboard*

- 2 additional ADB ports
- Dual ALT, SHIFT and Control keys for right and left-handed users
- 105-key QWERTY keyboard layout

$39.99 #81996

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True 128-Bit Performance for PCI Power Macintosh®

Utilize the latest in VLSI technology! This PCI Power Macintosh and compatible board gives you a wide 128-bit memory bus, and an ultra-fast 32-bit PCI bus interface for ultimate graphics performance. The TwinTurbo128M8 increases its speed proportionally when you operate in millions, thousands or 256-color modes. You'll instantly feel the increased speeds with smoother, more fluid scrolling and screen redraws. The TwinTurbo-128M8 features QuickTime compatibility and the ability to become a low cost MPEG player without additional hardware. Try one today.

TwinTurbo–128M8 Graphics/Video Accelerator (8MB VRAM)

was ~~$1089.99~~

Now $999.99 #79913

- True 128-bit performance for PCI Power Macintosh/Compatible computers
- Ultra-fast 32-bit PCI bus interface
- Realistic colors from 640x480 to 1920x1080
- 60-100Hz vertical refresh
- Smooth, fluid scrolling and screen redraws
- Three-year limited warranty

Critics Corner — MacWEEK ★★★★★ — MacUser ★★★★ — BEST BUYS

INTEGRATED MICRO SOLUTIONS

TwinTurbo–128M Graphics/Video Accelerator(4MB VRAM)	$589.99 #74629
TwinTurbo–128MP2 Graphics/Video Accelerator (2MB VRAM)	$299.99 #80379
TwinTurbo–128M8 Graphics/Video Accelerator(8MB VRAM) w/purchase of CPU	$899.99 #83266

Order an Imagine 128 Accelerator for Just $629.99 (You SAVE $170)!

IMAGINE™ 128

Now you can grab the first graphics accelerator for your Power Mac with PCI for a new low price of $629.99. You save $170! The Imagine™ 128 card boosts your Power Mac's drawing and screen refreshing, for faster, more efficient performance. It includes 128-bit architecture, exclusive WideBus™ design and DeepColor™ technology for brilliant graphics speed and detail. It comes in 4 or 8MB configurations. And it has a single chip processor that's capable of outputting 16.8 million colors. Order one today and SAVE!

Call MacMall today and order the hottest, 128-bit graphics accelerator card to ever hit the market!

- Twice the bits of ordinary 64-bit cards
- Get up to 16.8 million colors at 1600 x 1200
- 4 or 8MB high-speed VRAM

NEW LOW PRICE!

Imagine™ 128-bit 4MB VRAM **$629.99** #74550

Imagine™ 128-bit 8MB VRAM ..... $1349.99 #74551

NUMBER NINE VISUAL TECHNOLOGY

Price Slashed on ATI XCLAIMGA Video Card for the Power Macintosh® 9500/132

Was ~~$379.99~~. Now $279.99!

ATI XCLAIMGA video cards support both Apple® and VGA-style monitors. They provide razor-sharp images at resolutions up to 1600x 1200 and deliver 16.7 million true-to-life colors to meet your photo-realistic color needs. Plus, you get powerful zoom features, on-the-fly depth switching and much more!

ATI XCLAIMGA *mach64* 2MB VRAM PCI **$279.99** #73531

ATI XCLAIMGA *mach64* 4MB VRAM PCI ..... $429.99 #73532

ATI 2MB VRAM Upgrade for Power Mac™ 9500 $239.99 #73495

Easily Connect a PC Monitor to Your Mac

It's the most universal PC monitor adapter on the market! The incredible Liberty Adapter lets you take advantage of the multi-resolution features (and prices) of PC monitors. Share one monitor between all Macintosh® computers And enjoy access to new resolution switching software from Apple®.

Liberty Adapter: Mac™ to PC™ monitor DB15M/HDB15F **$33.99** #65748

MacLiberty Adapter: Mac™ to Mac™ monitor DB15M/DB15F $33.99 #65749

ENHANCE

Apple® Color Monitors!

Authorized Catalog Reseller

Apple® Multiple Scan 14" Display

- 12.4-inch viewable image size (diagonal)
- Shadow mask picture tube
- 0.28mm dot pitch resolution: 640 x 480 at 67Hz
- Front-panel stereo speakers

$349 #77546

Apple® Multiple Scan 15" Display

- 13.3-inch viewable image size (diagonal) Flat Square screen
- Shadow mask picture tube
- 0.28mm dot pitch
- Resolutions: 640 x 480 pixels at 67Hz to 832 x 624 pixels at 75Hz
- Stereo speakers

$479 #66068

Apple® Multiple Scan 1705 Display

- 15.8-inch viewable image size (diagonal) screen; Shadow Mask CRT
- Supports multiple video formats, such as VGA and SVGA & resolutions up to 1024 x 768 pixels at 75Hz
- Anti-static, anti-glare bonded panel
- 0.28mm dot pitch **$759** #75945

AppleVision® 1710 Display ..$969 #78143 Apple® Multiple Scan 20" Display $1979 #75946

AppleVision® 1710AV Display $1079 #74014

Fax your order 310•225•4000 — OFFER CODE MacUser ZMUS6B1 — Order Anytime **1•800•217•9498**

radius MORE Detail, MORE Colors and MORE Speed for Your Projects!

ThunderPower 30/1920

Wow! This PCI graphics card can support the largest display resolution ever. It can show 383% of the information of the PowerMac 9500's two-page resolution. Order it today. And turn your Power Mac into a professional color workstation.

- 1920 x 1080 enhanced super resolution
- 1600 x 1200 super resolution
- The world's fastest QuickDraw

$1729.99 #82275

NEW PRODUCT!

Boost your graphics performance beyond belief and enjoy razor sharp images with the ThunderPower 30/1920!

Thundercolor 30/1600 PCI 6MB Graphics Card	$1999.99	#73213
Thunder 30/1600 PCI 6MB Graphics Card was ~~$1199.99~~ Now	$1099.99	#73215
Thunder 30/1152 PCI 3MB Graphics Card	$799.99	#73216
Precision Color 8/1600 2MB was ~~$399.99~~ Now	$349.99	#81767
Precision Color 24/1600 4MB was ~~$349.99~~ Now	$529.99	#81768

It includes: a video and audio interface, cables, cable adapters, video editing and special effects software, serial video machine control and character generation (CG)!

NEW PRODUCT!

VideoVision PCI (Full-Motion, Full-Screen Video)

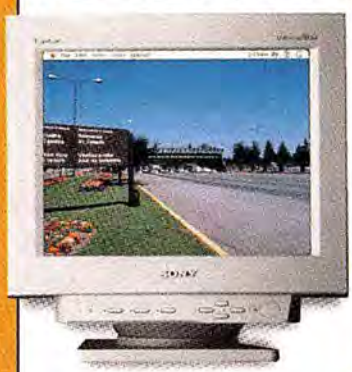
Just Arrived! **Full-motion, full-screen video editing and special effects for PCI Macs!** NEW VideoVision PCI is a QuickTime compatible nonlinear video editing and special effects system based on high-quality Motion JPEG technology. You can record and playback in NTSC at 640x480 at 29.97 fps and PAL 768x486 at 25fps. You get high quality video input and output, synchronized stereo 16-bit audio, and 24-bit color. It was designed to work with the Power Macintosh 7500, 8500 and 9500. Order this high performance system today!

- Includes Radius Edit 2.0, After Effects 3.0, ProVTR, DiskExpress
- Full-motion, full-screen video with synchronized 16-bit stereo audio, QuickTime compatible
- 3:1 to 50:1 compression ratio

$3499.99* #82591

*Price reflects $500 special rebate offer for VideoVision Studio and Telecast owners, direct from Radius. Price before rebate is $3999.99.

SONY NEW Low Prices on Sony Trinitron Monitors!



The Sony Multiscan® 15sx Features Front Panel Controls, PC and Macintosh® Compatibility & a Crystal-Clear Trinitron Tube for just $389.99!

- 15" Trinitron CRT (13.9" viewable image size) for excellent picture quality
- Digitally-controlled Multiscan Technology to support multiple PC and Macintosh® resolutions
- Supports maximum resolutions up to 1024 x 768 @ 75Hz
- Windows® 95, "plug and play" compatible
- Meets or exceeds industry standards—EPA, MPRII, NUTEK

was ~~$449~~ Now **$389.99** #79786

Multiscan® 15sfII Trinitron Graphic Display

- 15" Trinitron CRT (13.9" viewable image size) for excellent picture quality
- Digital Multiscan Technology to support multiple PC and Macintosh® resolutions
- Supports maximum resolutions up to 1024 x 768 @ 75Hz
- Windows® 95, "plug and play" compatible
- On-screen display of digital controls for easy picture adjustment
- Includes Macintosh® adapter

was ~~$499~~ Now **$469.99** #77251

Multiscan® 17sell Trinitron Graphic Display

- 17" Trinitron CRT (16" viewable image size) for excellent picture quality
- Digital Multiscan Technology to support multiple PC and Macintosh resolutions
- Supports resolutions up to 1600 x 1200NI
- On-screen digital controls for simple picture adjustment
- Includes Macintosh® adapter

was ~~$1099~~ Now **$969.99** #77253

Multiscan® 20sfII Trinitron Graphic Display

- 20" Trinitron CRT (19.1" viewable image size)
- Digital Multiscan Technology for multiple PC and Macintosh resolutions
- Supports resolutions up to 1600 x 1200NI
- On-screen digital controls for simple picture adjustment
- Includes Macintosh® adapter

was ~~$1899~~ Now **$1629.99** #77254

Multiscan® 17sfII Trinitron Graphic Display

- 17" Trinitron CRT (16" viewable image size) for excellent picture quality
- Digital Multiscan Technology to support multiple PC and Macintosh® resolutions
- Supports resolutions up to 1280 x 1024NI
- On-screen display of digital controls for easy picture adjustment
- Windows® 95, "plug and play" compatible
- Meets or exceeds industry standards —EPA, MPRII, NUTEK
- Includes Macintosh® adapter

was ~~$899~~ Now **$769.99** #77252

14" Trinitron Color Display (832 x 624) was ~~$289~~ ..... Now $249.99 #67079

FASTEST OVERNIGHT DELIVERY Call by 11:00 pm EST for Delivery by 10:30 am the Next Day via FedEx

Panasonic Monitors Are Backed by an Extra-Long 3-Year Warranty!

3 Year Limited Warranty

PanaSync/Pro™ C-2192P

- 21" Color Diagonal Flat Square Screen Display
- On-Screen Adjustment Menus
- 0.25mm Dot Pitch
- 1600 x 1280 Maximum Resolution
- MPRII Compliant
- 21 Preset User Memories

$1699.99 #77206

LOW-COST, Incredible 0.25mm dot pitch and 1600x1280 maximum resolution simply blows the competition away!

PanaSync/Pro™ C-1792P 17" Display .. was ~~$729.99~~ Now **$709.99** #77207

➤ 17" Color Diagonal Flat Square Screen Display ➤ On-Screen Adjustment Menus ➤ 0.25mm Dot Pitch ➤ 1600 x 1280 Maximum Resolution NI ➤ DQ-DAF™ Gun Technology ➤ AGRAS Coating (no glare, no reflection and no static)

Panasonic E15 Color Monitor ..... **$349.99** #81157

➤ 15" Color Diagonal Flat Square Screen Display ➤ Full Scan Capability ➤ 0.27mm Dot Pitch ➤ Up Front Controls ➤ On-Site Replacement ➤ 24 Hour/7 Day Customer Support ➤ AGRAS Coating (no glare, no reflection and no static)

Monitors include first year on-site replacement & Mac™ Adapter.

PanaSync S17 17" Display

- 0.27mm dot pitch CRT
- 1280 x 1024 NI Resolution
- Enhanced icon-driven display with 5 language options
- Low power consumption (120 Watt typical)

$669.99 #78941

Panasonic Display Monitors

PanaSync/Pro™ P15 15" Display

- On-Screen Adjustment Menu
- 1280 x 1024 Maximum Resolution NI
- MPR II Certified
- 0.27mm Dot Pitch
- AGRAS Coating (no glare, no reflection and no static)

was ~~$419.99~~

Now **$399.99** #79131

Grab a FREE Copy of NEW Adobe™ Premiere 4.2 (Full Version–a $799 Value) with the Bravado 1000 PCI!

Create high-quality professional movies with the affordable Bravado 1000 PCI. You can capture full-screen, full-motion-JPEG video in real time. And quickly record to your hard drive with its fast 32-bit PCI bus. It gives you 24-bit color capture through Composite and S-Video input and output, too! Plus, you get **FREE** Adobe Premiere 4.2 full version! This powerful editing program lets you combine video, animation, still images, and graphics to bring your ideas to life. Order this awesome deal today. And start making professional movies for less!

Bravado 1000 PCI
$899.99
#81231

- 32-bit PCI bus for blazing data transfer & **FREE** Adobe Premiere 4.2 full version
- 24-bit true color capture through Comsite & S-Video on-board
- Full-screen, full-motion video using Motion-JPEG technology

Targa 1000 PCI for Mac™	$2799.99	#79773
Targa 2000 Nubus for Mac™ (NEW LOW PRICE!)	$1799.99	#68777
Targa 2000 PCI for Mac™	$3999.99	#76166

TRUEVISION A RASTEROPS COMPANY

NEW Lower Prices on ViewSonic® Monitors!

ViewSonic® 17GA PerfectSound 17" Monitor (15.9 viewable area)

➤ 86Hz refresh rate ➤ 1280 x 1024 resolution ➤ High fidelity dome speakers built into bezel ➤ 0.27mm Dot Pitch ➤ 3-year limited warranty

was ~~$768.99~~ Now **$719.99** #72492

Best Buy MacUser

ViewSonic® GT770 ViewSonic®
17" Monitor (15.9 viewable area)

➤ .25mm dot pitch ➤ 80Hz refresh rate ➤ 1280 x 1024 non-interlaced resolution ➤ Vertical flat SonicTron™ screen for high contrast images with richer, brighter colors ➤ 3-year limited warranty

was ~~$829.99~~ Now **$774.99** #81043

ViewSonic® PT810
21" Monitor (19.5 viewable area)

- 19.5" viewable image size
- .30mm aperture grille
- 73Hz refresh rate at 1600 x 1200 and 85Hz refresh rate at 1280 x 1024 resolution
- 3-year limited warranty

MacUser ★★★★

was ~~$1999.99~~ Now **$1899.99** #81051

15GA PerfectSound™ Multimedia Monitor 15" (14" viewable)	$479.99	#73220
17EA Multimedia Monitor 17" (16" viewable)	$678.99	#81041
ViewSonic GT800 Monitor 20" (19.1" viewable)	$1649.99	#81046
ViewSonic® PT770 Monitor 17" (16" viewable)	$899.99	#81044
ViewSonic® 21PS Monitor 21" (19.7" viewable)	$1698.99	#81047

"SuperScan Took Top Honors In Every Important Performance Category"

—MacWorld February 1996

Its Black Matrix CRT with dynamic focus delivers vibrant colors!

Price Slashed $100! SuperScan 21" Color Display

In February, 1996, MacWorld editors voted the SuperScan Mac™ 21 their "runaway favorite for focus, brightness, contrast, and color." They also praised its "sensible, intuitive controls" and "reasonable price" – hallmarks of every SuperScan Mac™ monitor. Each is designed specifically for Power Macintosh®. This display is the perfect viewing solution for graphic design professionals, color houses or anyone who needs high-resolution, detailed color and a large two-page display.

~~was $1899.99~~ NOW **$1799.99** #71919

3 Year Limited Warranty

All RasterOps™ by Hitachi monitors come with a 3-year warranty.

RASTEROPS® by HITACHI®

SuperScan Mac™ 21" HR Color Display

- 1280 x 1024
- 0.28 mm Dot Pitch
- Soft Silica Anti-glare coating
- 50-120Hz refresh rate

$2099.99 #78746

BEST BUY

SuperScan Mac™ 20" Color Display

- 1280 x 1024 Resolution
- 0.28mm Dot Pitch
- Soft Silica Anti-glare coating
- 50-120Hz refresh rate

$1399.99 #71918

SuperScan Mac™ 17"

- 1280 x 1024
- .26mm dp (NI)
- 17" (16V)
- Focus, Anti-static
- 50-120Hz refresh rate

$899.99 #71917

SuperScan Mac™ 17s

- 1280 x 1024
- .28mm dp (NI)
- 17" (16V)
- Color Multiscan w/Microprocessor
- 47-104Hz refresh rate

$749.99 #78747

The Samsung 17GLi has Ultra-Clear Coating and Superior Image Detail!

This Hard-working display gives you stunning 1280x1024 resolution!

SyncMaster™ 17GLi Color Monitor

You'll appreciate the quality found in the Samsung 17GLi! You can view a large edge-to-edge area of 15.75." Work for long hours without eye-fatigue because of its UltraClear and anti-static coating. And see your images in dazzling 1280 x 1024 maximum resolution. Plus, you enjoy quick and accurate on-screen adjustments and plug-and-play compatibility. It even includes a FREE Mac adapter and a coupon for FREE Screen Management software. Order it today. With a full three-year warranty, you'll be assured of long-lasting performance!

$759.99 #72408

- UltraClear Coating
- 17" inches (15.75" viewable)
- .28mm dot pitch
- 1280 x 1024 maximum resolution
- Full 3-year warranty
- 60Hz refresh rate
- Plug-and-play compatibility

SyncMaster™ 4NE 15" Monitor w/Mac™ adapter	$349.99	#65556
SyncMaster™ 15GLi Monitor w/Mac™ adapter	$459	#72407
SyncMaster™ 6Ne Monitor w/Mac™ adapter	$649.99	#78810
SyncMaster™ 17GLSi Monitor w/Mac™ adapter	$919.99	#72404
SyncMaster™ 21GLS Green Series 21" Monitor .28dp	$1769.99	#78740

BEST BUY **All Samsung Products are a MacMall Best Buy!**

SAMSUNG

Pivot 1700: The "Way Cool" way to Surf the Web!

Now you can enjoy the best of both display worlds! You can compose your documents or surf the web in portrait view (with a taller page view than any 21" monitor). Then, just pivot your display to landscape view for spreadsheets, games and desktop video. The ultimate monitor for all the work you do!

- Pivot between portrait and landscape without closing applications
- Up to 76Hz refresh rate for crisp, flicker free images
- 24-Bit color at 1280 x 1024 with on-the-fly resolution switching
- Ultra high contrast Invar shadow mask CRT with built-in anti-glare

Critics Corner — MacUser — 20 DAY MONEY BACK GUARANTEE — 3 YEAR WARRANTY — BEST BUY

Can your monitor do this?

Pivot 1700 .28 dp monitor	was $999 Now $899.99	#75000
Pivot 1700 .26 dp monitor	$949.99*	#72477

Portrait Display Labs — *The Way Monitors Should Be*

* Price reflects $100 mail-in rebate direct from Portrait Display Labs with purchase of any Apple® Macintosh or Power Computing CPU. Price before rebate is $1049.99.

FASTEST OVERNIGHT DELIVERY Call by 11:00 pm EST for Delivery by 10:30 am the Next Day via FedEx

Turn Your Television into a Powerful Presentation Tool!

Now you can convert your television into a monitor. The new AVerKey Plus has improved ASIC design, and a true 100% flicker-free display. You also get a modified 640 x 480 x 256 color conversion and composite/S-Video output. (Works with Mac™ systems with VGA output only.)

AVerKeyPLUS, PC and Mac™ to TV Converter

$199.99 #75401

No software driver needed, simply plug in your computer and TV monitor and you're ready to deliver your presentation!

The AVerKey 3 from AVerMedia is a video conversion solution that requires no software driver—simply plug it into your computer and TV monitor and you're ready to go!

- Advanced flicker-free technology
- Zoom and pan, plus screen freeze
- Up to 640 x 480 resolutions
- Full screen underscan/overscan
- Dual display
- Remote control operation

AVerKey 3 PC and Mac™ to TV Converter w/Remote

AVerMedia

was ~~$299.99~~ Now **$289.99 #68938**

NEW Trinitron CRT monitors are easy on your eyes...and your wallet!

FREE Mac Adapter & Kodak Colorific Software!

DX15T 15" Color Display

Want sharp, brilliant color without spending a bundle? Then this monitor is for you. It features a super-fine pitch Trinitron screen and a broad horizontal and vertical frequency range to ensure crisp, flicker-free images at even the highest resolutions.

$399.99 #82416

- Trinitron CRT with overscan
- Supports high-res formats up to 1280 x 1024
- On-screen display with color control
- Backed by a 3 year limited warranty

DX17T 17" Color Display

- Trinitron CRT with overscan
- Supports high-res formats including Mac™ 1152 x 824
- Digital controls
- Backed by a 3 year limited warranty

Manufacturer: MAG InnoVision **$749.99 #82417**

DX1495 14" Color Display	$269.99	#82414
DX1595 15" Color Display	$379.99	#82415
DX1795 17" Color Display	$649.99	#82418

NEC Now SAVE $50 Off NEC's Super-Crisp, M500 CromaClear Display!

MultiSync M500

15" CromaClear™ CRT Color Display

NEW CromaClear™ CRT technology, 0.25 mm mask pitch, 1280 x 1024 maximum resolution NI, high flicker-free refresh rates up to 120 Hz, precise focus and color (10% to 20% brighter than other monitors), built-in speakers, On Screen Manager, digital controls and 3-year limited warranty.

Includes super-sharp 0.25mm dot pitch and NEW brighter CromaClear Technology!

$489.99* #79734

*Price reflects $50 Mail-in Rebate. Price before rebate is $539.99. Offer expires August 30, 1996

MultiSync XV17+ 17" Color Display

17" Flat Square CRT, 15.6" viewable, Exclusive OptiClear™ screen surface, .28mm dot pitch for crisp text and graphics, FullScan™ capability for edge-to-edge images, 1280 x 1024 non-interlaced maximum resolution, OSM™ (On-Screen Manager) and 3-year limited warranty. **$799.99 #78542**

MultiSync M700 17" CromaClear™ CRT Color Display	$879.99	#79735
MultiSync XP17 Color Display	$1079.99	#66765
MultiSync XP21 Color Display	$1999.99	#66766
MultiSync XE21 Color Display	$1699.99	#66763
MultiSync XV15+ Color Display	$478.99	#78541
MultiSync C500 Color Display w/adapter	$379.99	#79172
MultiSync C400 Color Display w/adapter	was ~~$329.99~~ Now $299.99	#78859

The PressView 21" display with professional color matching tools!

PressView 21SR

It's so much more than a display! The PressView 21 is a fully integrated system that combines a 21" display, a highly accurate colormeter and custom-designed display system management software. Only PressView gives you the tools to ensure that the color you see on screen accurately matches the color you print. Its DiamondTron aperture-grille picture tube has an extended color gamut for crisper image quality and brighter colors. And you can even add a Radius graphics card to create your own color-preproofing display system. Order one today. It's the easiest way to control the way you see color.

$3399.99 #73558

MacUser 4½

- .31mm Dot Pitch
- 1600 x 1200 resolution
- 15.0" x 11.2" viewable screen area
- 75Hz standard refresh rate, 152Hz maximum
- Includes Agfa FotoFlow, Apple ColorSync, EFI efiColor and Kodak Precision software

PressView 17SR	$1999.99	#74548
PrecisionView 21	$2349.99	#73557

radius

Fax your order 310•225•4000 **OFFER CODE MacUser ZMUS6B1** Order Anytime **1•800•217•9498**

World's Most Powerful Label Printers

The LabelWriter XL prints faster and holds more labels than any other label printer in its class. The LabelWriter XL Plus handles a wider variety of label sizes and bigger rolls than any other label printer. Both come with easy-to-use software, featuring built-in address books, automatic font sizing, Postal bar coding and a Mac™ printer driver so you can print directly from any Mac™.

LabelWriter XL Plus $244.99 #64852

LabelWriter XL $149.99 #65638

Call your sales rep for additional label sizes & network interface options.

Database Value Pack (Includes: XL Plus, FileMaker Pro 2.1 and 1000 Labels & Templates) $289.99 #65846

Label Type	LW XL	LW XL Plus	Item No.	Price
White Address (700)	✔	✔	71116	$14.99
Clear Address (130)	✔	✔	71114	8.99
Yellow Address (130)	✔	✔	74338	5.99
White File Folder (260)	✔	✔	70779	7.99
SyQuest® Cartridge (500)		✔	74274	29.99
8mm Video White 2-up (1400)	✔	✔	74275	25.99
White Shipping (300)		✔	71115	14.99
Videocassette–Spine (400)	✔	✔	74272	16.99
Videocassette–Top (300)		✔	74273	16.99
Audio Cassette (700)		✔	74276	28.99

GCC TECHNOLOGIES

The Elite Series Printers.

- Large Format; High Res.
- Affordable
- 25 MHz AMD 29030 RISC processor
- 16 ppm; 300, 600 dpi selectable
- 25 MHz RISC processor w/cache
- Ethernet Standard

Elite 600et Lite Printer *Limited Time Offer!* $1195.99 #80464

Elite XL 616 $2699.99 #74309

PRODUCT 1995 ELECTRONIC PUBLISHING

Elite XL 608 $2399.99 #69721
- 8 ppm; 600 x 600 dpi
- Edge to edge 11" x 17" (full bleed)
- 25 MHz AMD 29030 RISC processor w/cache v Std 6MB up to 64MB

Elite XL 808 $3199.99 #69722
- AccuGray technology
- 8.8 ppm; 800 x 800 dpi
- 25 MHz RISC processor w/cache
- Std 12MB up to 64MB

Elite XL 1208 $4499.99 #72292
Offers all the features of the Elite XL 808, plus:
- True 1,200 x 1,200 dpi resolution for typeset-quality output; 11" x 17" Paper
- Std 24MB of RAM up to 64MB

Elite XL 1208 SuperSize
- 12" x 20"; 32MB of Ram
- True, 1,200 x 1,200 dpi resolution for typeset-quality output

$6399.99 #77279

Elite XL 608/616/808/1208 Toner Cartridge ..... $199.99 #69723

MacMall also carries Paper Trays & Traydecks for all GCC printers. Call toll-free and ask your sales person for details.

Photo Quality COLOR Printing for Today's Office

EPSON

$379.99 #75093

Epson® Stylus Pro

The Epson Stylus Pro prints outstanding photographic images, presentations, transparencies and correspondence. It prints in 720dpi color on plain paper. And it also has a network option.

$1799.99 #77922

Epson® Stylus Pro XL

The Epson Stylus Pro XL delivers professional quality color for your photos and art proofs. Use its 720 x 720dpi resolution for your full bleed 11" x 17" prints. Maximum page size is 13" x 19". Pantone® calibration w/Postscript™ option.

$279.99 #83463

Epson® Color Stylus 500

Wow! This super low-priced ink jet printer gives you 720x720 dpi Photo Quality color and fast Laser Quality black text. And it includes the "Look Your Best Color Pak" for image editing, iron-on art and more.

Add These Epson Supplies to Your Order

Ink Cartridges
- Black Ink Cartridge Stylus COLOR II & IIs ..... $22.99 #74557
- Black Ink Cartridge for Stylus Pro & Pro XL ..... 15.99 #70747
- Black Ink Cartridge for Stylus 500 ..... 19.99 #82905
- Color Ink Cartridge for Stylus COLOR II ..... 29.99 #74558
- Color Ink Cartridge for Stylus Pro & Pro XL ..... 28.99 #70746
- Color Ink Cartridge for Stylus 500 ..... 29.99 #82906

Power Rips
- Birmy PowerRip for Stylus Pro *(postscript option)* ..... $219.99 #77043
- Birmy PowerRip for Stylus Pro XL *(postscript option)* ..... 249.99 #78139

Ethernet and Local Talk Options
- Ethernet/Ethertalk Interface Card (Stylus Color Pro, Pro XL) ... $399.99 #74559
- LocalTalk Interface for Stylus 1500 and LQ Printers (MAC) .... 138.99 #68785

Paper
- 720dpi Coated Paper-Letter *(100 sheets)* ..... $19.99 #74554
- 720dpi Coated Paper-Tab. *(200 sheets)* ..... 59.99 #78700
- 720dpi Coated Paper-Legal *(200 sheets)* ..... 34.99 #74552
- 720dpi Super B Size Paper *(100 sheets)* ..... 39.99 #80205

See Page 6 for More Information on Epson Printers!

FASTEST OVERNIGHT DELIVERY Call by 11:00 pm EST for Delivery by 10:30 am the Next Day via FedEx

Save $100 with the Apple® "Cool Cash Back" Promo

Order Selected Apple printers and Apple Performa computers and get a $100 rebate. See pages 22-23 for details.

Authorized Catalog Reseller

Apple Laser Printers

Razor sharp 600dpi printing, fast!

Apple LaserWriter® 12/640 PS

Forget waiting for print-outs! The Apple LaserWriter 12/640 PS cuts even the heaviest print jobs down to size with a blistering print speed of 12ppm at 600dpi. It's the perfect printer for workgroups and high volume desktop publishing. And with the optional duplex printing mode, you can print on both sides of the page to easily create your own professional, camera-ready books, magazines, training manuals, newsletters, mailers and more. Order yours today and lose some "wait."

- Outstanding 600 x 600 dpi Print Quality
- Lightning fast 12 pages per minute printing
- Cross Platform Mac® OS & Windows Compatible
- 4MB of RAM expandable to 64MB
- LocalTalk®, Ethernet, Parallel Built-in
- Extensive Paper Handling Support
- Supports Photograde (w/additional RAM)
- FinePrint™ Technology
- Quick To Print First Page

Truly affordable 600dpi Printing:

Apple LaserWriter 4/600 PS

Great for your home, school or small business, this 600dpi PostScript™ dynamo delivers crisp, clear printing at a fast 4 pages per minute. Plus it's easily upgradeable to meet your growing needs.

$895 *w/ Toner* **#72805**
Cable not included

Laser-quality printing at Inkjet prices:

Apple Personal LaserWriter® 300

Designed for personal and home office use, the Apple Personal LaserWriter 300 printer delivers sharp, clear output at an affordable price. Complete with Toner and cable.

$629 *includes Toner and Cable* **#68269**

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Apple InkJet Printers

For the complete line of Apple printers & accessories see pages 22-23.

Apple StyleWriter® 1200:

Fast, crisp printing, cheap

- Clear 720 x 360 dpi b&w printing
- Sharp 360 x 360 dpi grayscale printing
- Up to 3ppm b&w (normal mode)
- Space-saving design

$219 **#69390**

Apple COLOR StyleWriter® 2200:

High-performance color printing on the go

- Weighs just over 3lbs. and easily fits in your briefcase
- 360dpi; 5 ppm b&w 3 ppm grayscale, 0.3 ppm color
- QuickDraw™ enhanced with Apple ColorShare® and Apple ColorSync®

$395 **#72803**

Apple COLOR StyleWriter® 2500:

The best of the best

- 720 x 360dpi resolution for vivid color and crisp b&w
- Combines color images with true black text
- Up to 5 ppm for b&w; .66 ppm for color
- ColorSync ensures closest possible color match

$399 **#79379**

Apple COLOR StyleWriter® 1500:

You don't have to pay a lot for great color printing

- 720 x 360dpi b&w printing
- 360 x 360dpi color & grayscale printing
- Up to 3 ppm b&w, 0.3ppm color
- Comes complete with cables and both black and color ink cartridges

$299 **#79378**

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NEW LOW PRICE!

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- Prints up to 5 pages per minute in black, 1.5 in color
- Features two-sided printing for greeting cards and envelopes
- Paper types include banners, labels and transparencies
- HP's ColorSmart technology for brilliant color
- One-year warranty

Banner Paper
A Size
100 Sheets
$12.99 #81398

HP DeskWriter 680C Printer w/Kai's Power Goo SAVE $16 ..... $319.99 #82777

HP DeskJet 340CM Printer w/Mac® Adapter

*Price reflects $50 mail-in REBATE from HP. Price before rebate is $319.99. Offer Valid from 8/1/96 thru 1/31/97

This compact printer can travel with you, for brilliant color printing anytime, from any Mac computer!

$269.99* #77562

- 600 x 300dpi black, 300dpi color resolution
- Up to 3ppm black, 2-4ppm color printing
- ColorSmart technology for vivid color
- One-year warranty

HP DeskJet 870Cse Printer

NEW PRODUCT!

What a great value! The new HP DeskJet 870Cse gives you fast on-screen help, an extensive font collection, a sample HP Paper Pack and much more!

$498.99 #82695

- Prints up to 8ppm black, 4ppm color
- HP's RealLife Imaging System and C-REt for premium output

HP LaserJet 5MP Printer

Refurbished HP LaserJet 5MP Printer $899.99 #78602

$1049.99 #71647

The 5MP boasts wireless printing, so your home office cable tangles are a memory!

The HP LaserJet 5MP printer delivers 600dpi at a FAST 6ppm. Adobe Postscript Level 2 Print Language. It's a reliable, efficient home office laser printer at one great price!

HP LaserJet 5L Xtra w/GDT PowerPrint ..... $569.99 #81994

HP DeskJet 1600CM Printer

- 600dpi black, 300dpi color
- Up to 9ppm black, up to 4ppm color printing
- HP JetDirect network interface
- Standard PostScript™ level 2 print language

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It's the FASTEST HP color DeskJet printer! Plus, its HP JetDirect network interface gives you seamless operation on your network!

HP Color LaserJet 5M Printer

You'll enjoy photo-realistic printing for persuasive documents in vibrant colors!

BEST BUY!

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Attention Graphics Professionals! The HP Color LaserJet 5M Printer Delivers Crisp Laser-Quality Print in Blazing Color!

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Enjoy HP Image Quality and Reliability with the NEW Value-Priced HP ScanJet 4p Scanner!

It's the affordable color/grayscale scanner with one-step, single-pass scanning! It scans both your color and grayscale images (and text) in one time-saving exposure. Its 1,200dpi enhanced resolution and 300dpi optical resolution ensure the best results with your office printer (you can capture photographs in 1,024 levels of grays and over 1 billion colors). It's bundled with Visioneer PaperPort software for finding and organizing your scanned images visually instead of by file name. And it includes Adobe Photoshop LE, HP PictureScan with HP AccuPage and HP Scanjet Copy utility. It even includes a one-year warranty and a service and support plan to keep you up and running. Order it today. It's the ideal office scanner for budget-minded value hunters!

The HP ScanJet 4c Scanner Captures High-Quality Images & Text for Your Office Communications!

This scanner boasts 2,400dpi enhanced and 600dpi optical resolution for your color and grayscale scans. Its 30-bit color and 10-bit grayscale give you super-accurate images (it captures over a billion colors and more than a thousand shades of gray for improved shadow detail). Use it to create extremely detailed scans of line art, graphics and text. Its HP DeskScan II software automatically determines your image type and sets your brightness and contrast levels for flawless scanning every time. And it includes Visioneer PaperPort software, Adobe Photoshop LE and OmniPage "Limited Edition" OCR software, HP DeskScan II, and HP ScanJet Copy utility.

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Manage your paper trail from your desktop with the HP ScanJet 4s Scanner!

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OmniPage Professional 6.0 Full Upgrade Mac™/PowerPC™ ..... $147.99 #78336

Every Award-Winning UMAX® Scanner Includes a Stack of Valuable Extras!

Color Vista S-6E

MACWORLD MW ★★★★ JULY 1996

Includes:
Adobe™ PhotoDeluxe™, Presto! PageManager (with OCR)

NEW LOW PRICE!

$394.99 #81385

WOW! This single-pass, high-speed 24-bit color flatbed scanner is only $394.99. It gives you fast scanning with its SCSI-II interface, a 256K bus caching buffer and micro-stepping optical transmission. Plus, it includes Adobe PhotoDeluxe, Presto! PageManager (with OCR) software in the bargain!

Vista S-6E w/Full Photoshop ..... $599.99 #81387

Color Vista S-12

MacUser RATED ★★★★

Includes:
Adobe™ Photoshop™ 3.0, Presto! PageManager (with OCR)

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Using its unique UltraView™ Technology, this awesome scanner delivers a maximum resolution of 9,600dpi making it incredible for enlargement and detail work. You enjoy a 600x1,200dpi hardware resolution to capture the smallest area for super-sharp images. And its parallel circuit design simultaneously processes red, green, and blue channels for faster scanning.

Vista S-12 LE w/Photoshop LE .... $798.99 #81389

Color PowerLook II

"Excellent All Around" ★★★★★ PCComputing

Includes:
Full Photoshop™ 3.0, Transparency Adapter, Kai's Power Tools 3.0 SE, binuscan PhotoPerfect-Advanced

$2295.99 #81393

The PowerLook II single-pass scanner features 36-bit color data capture for over 68.7 billion colors. It's armed with a density range of 0.1 to 3.3 D, for the richest and sharpest images. You can use its UltraView Technology for brilliant enlargements. It also includes a FREE transparency adapter that enables you to scan transparent images up to 8.3" x 10".

BLOWOUT!
PowerLook I w/Full Photoshop & Transparency Adapter ..... $1699.99 #77567

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Nikon ELECTRONIC IMAGING

ScanTouch AX-110

This is one feature-packed scanner at a bargain price! You get brilliant 24-bit color, a generous scanning area and color previews for perfect scans, every time. It even includes imaging software.

- 300 x 600dpi optical resolution
- 4,800 x 4,800 interpolated resolution
- 6 second per-page color preview
- 8.5" x 11.7" scanning area
- 24-bit true color

INCLUDES: Adobe™ Photoshop™ LE & OmniPage LE

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Transparency Adapter for AX-110 . . . $399.99 #81888
Auto Document Feeder for AX-110 . . . $459.99 #82185

ScanTouch AX-1200

It's a professional-level scanner that's affordable! It boasts 565 x 1,200dpi optical resolution, for crisp, clear scans. Order it today. Enjoy brilliant 30-bit color at a low price.

- 565 x 1,200dpi optical resolution
- 8.5" x 14" scanning area
- 1,200 x 1,200 interpolated resolution
- 30-bit true color
- 12 second per-page color preview
- Includes Full Adobe™ Photoshop™ 3.0 & OmniPage Direct

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Transparency Adapter for AX-1200 . . . . . $569.99 #67116

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Need fast turnaround on tight deadlines? Check out the SUPER CoolScan LS-1000. It can scan a full-color slide at 2,700dpi in less than 40 seconds! This single-pass high-performance scanner has LED illumination, 12-bit A/D, Autofocus and special optics. It gives you accurate color rendition and rock-steady color calibration. Add the Auto Slide Feeder SF-100 and you can scan up to 50 mounted slides in less than one hour! Order one today. And never worry about scanning quality (or deadlines) again!

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Auto Slide Feeder for LS-1000 . . . . . $539.99 #74279

CoolScan II LS-20

- Fast 80-second scans at 2,700dpi
- 8-bit A/D conversion
- Autofocus ensures sharp scans
- Advanced LED illumination for speed, reliability and accuracy
- True Zero footprint

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ARTEC
Real Life Scanning

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Artec introduces its lowest-cost 4800dpi scanner! The **NEW** AT3-M is super-affordable, long lasting, SCSI equipped and gives you beautiful color and grayscale scans! This 24-bit, single-pass SCSI-II scanner lets you daisy-chain a hard drive, CD-ROM or another SCSI device to the AT3-M. And its powerful 4800 x 4800dpi resolution guarantees detail. Plus, you get a Long-Life Cold Cathode Fluorescent Lamp which will last 30 times longer than traditional hot cathode fluorescent lamps. It has a scanning area of 8.5" X 11". Its lightweight and modular dust-proof design make it extra attractive, plus the AT3-M includes Photoshop™ LE, WordLinx OCR and Adobe™ Plug-In Driver. Order it today. It's reliable, high-quality, SCSI ready and very affordable.

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The ViewStation AT3-M is packed with software for fast image processing!

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It can scan A4 size color images in 16.8 seconds! This blazing-fast 24-bit, single-pass flatbed scanner is an excellent choice for your home business or office. It offers an extra large 8.5" x 14" scanning area and stunning 4,800dpi resolution (through software interpolation). It also includes an LCD status display, a copy holder and a long lasting cold cathode fluorescent lamp that eliminates early lamp burn out. Order one and start scanning superior quality images at one of the best prices around!

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The LCD display tells you status at a glance, while the built-in copy holder keeps pending scans conveniently at hand!

Get More Software Power with:

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The Epson ES-1000C Mac™ Color Scanner is an affordable fully-featured color scanner perfect for the professional office user. Its incredibly high 3,200dpi resolution reads over one billion colors, for brilliant professional-looking scans. You can add images (and impact) to your office publications, reports and even invitations. It comes with SCSI and bi-directional parallel ports for dual connections to a Mac™ and PC at the same time. Plus, it includes Adobe™ Photoshop™ LE, Scantastic with PIM and DA Module, TextBridge OCR, & SCSI Cable.

- 30-bit per pixel (Internal)
- Text Enhancement Technology (TET)
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Enjoy superior scanning with the Epson ES-1200C Pro Mac™

Enjoy superior scanning with the Epson ES-1200C Pro Mac™. With a resolution of 4,800dpi and true 30-bit color, this desktop scanner gives you maximum quality and performance. Includes full Adobe™ Photoshop™, Kai's Power Tools®, Scantastic and SCSI Cable.

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EPSON

Critics Corner — MacUser — MW Editors' Choice

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TextBridge® Pro 3.0 for Mac® not only saves you from retyping your documents, but the hassle of reformatting them too. It also provides an easy-to-use solution for scanning, recognizing and editing paper-based information bound for the World Wide Web. TextBridge® Pro duplicates the original page layout of your document and retains the text flow, graphics and page elements—including cell tables with lines, headers & footers and newspaper style columns.

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- 300 x 600dpi optical resolution
- 2400 x 2400dpi software enhanced
- Includes **FREE** ScanWizard, OCR from Caere and Color It!

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With this **NEW** Microtek bundle you'll be fully equipped to unleash your creativity! Besides getting one of the fastest and most powerful scanners on the market, you'll also get Fractal Design's popular Painter 4.0 (on CD-ROM), the world's leading paint program! You can turn scanned photos into multi-colored mosaics. Apply special effects like descreening, sharpening and tinting with Microtek's ScanWizard™ software. Plus, you get a full version of LivePicture 2.1, OCR software from Caere and Color It! Order it today. It even includes a $499.99 Transparent Media Adapter absolutely **FREE**!

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Better Images Through Innovation.

ScanMaker E6 Comes with your Choice of Software Bundles!

Because of the E6's reliable scanning quality and 30-bit color depth, you can be assured that you're getting ultra-fine highlights and shadows...with stunning accuracy!

- Single-pass scanning
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- 4,800dpi maximum resolution
- Large 8.5" x 13" scanning area

MICROTEK ScanMaker E6

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ScanMaker E6 Pro 30-bit Scanner w/Photoshop™ 3.0 Full Version, Live Picture 2.1, ScanWizard, Photoshop Plug-in and Caere's OCR Software

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AGFA

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Here's the perfect office assistant! This advanced scanner gives you a special lift-off hinge for scanning books and three dimensional objects. You can energize your brochures, flyers and letters with color images. And enjoy the flexibility of scanning information directly to your fax modem or your printer, for quick and easy fax, copy and scanning operations. Check out one today!

INCLUDES: Adobe™ Photoshop™ LE, OmniPage Limited Edition, SOFT Copy, FotoLook, FotoSnap and FotoTune

- 300 x 600dpi (2400max)
- 24-bit, single-pass
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NEW!

StudioStar! Integrated 30-bit Color Scanning, Faxing & Copying!

Of course, you can scan super-detailed images! And with its special lift-off hinge you can scan three dimensional objects, too! And its advanced software lets you streamline your office by scanning directly to your modem or printer for quick faxing and copying.

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- Single-pass
- 2.7 density, 8.3" x 14" scanning area

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StudioStar w/Photoshop Full Version & OmniPage Direct . . $1079.99 #82579

Arcus II–The 36-bit Scanner for High-End Users!

The Arcus II scanner gives you professional 36-bit color scans at 600 x 1200dpi with an 8.5" x 14" scanning area. It can register more than 68 billion color combinations and capture deep shadows and bright highlights with ease (it's perfect for adding maximum impact to all your high-end full-color spreads).

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$1995.99 #66643

INCLUDES: OmniPage Direct and Photoshop LE!

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For a rock-bottom $749.99, you can have this 400 x 800dpi, 8.5" x 14", 30-bit RGB scanner that scans detailed color, continuous tone, halftone and line art images at resolutions from 600 to 2,400dpi.

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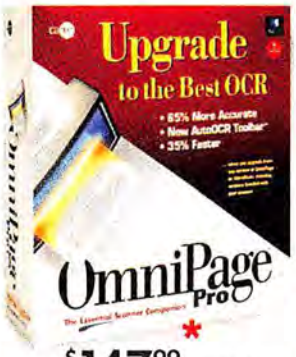

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Critics Corner
"...Powerful and faster, Caere's OCR stalwart scores high on accuracy..."
–MacUser, January 1995

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REUSYS INFINITY

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The included Adobe Photoshop™ plug-in and utility software enable easy color adjustments, trimming and image editing. With other application software, high-res desktop publishing business presentations and personal applications are also possible.

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QuickScan 35 Features

- One-pass scanning at 2,820dpi optical, 2688x4032 pixel resolution
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BEST OF BYTE COMDEX/Fall '96

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DM-1 NTSC LCDColor Monitor	$479.99	#82504
DB1S Ni Cd Battery (Small Set of 3)	$27.99	#82503
DB1L Ni Cd Battery (Large Set of 3)	$31.99	#82502
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Pixera Personal System $799.99
(Not Pictured)
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PCMCIA version #82598

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System requirements
68040/PowerPC processor (PowerPC™ recommended), 16MB RAM

pixera visual communication SYSTEMS

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EPSON

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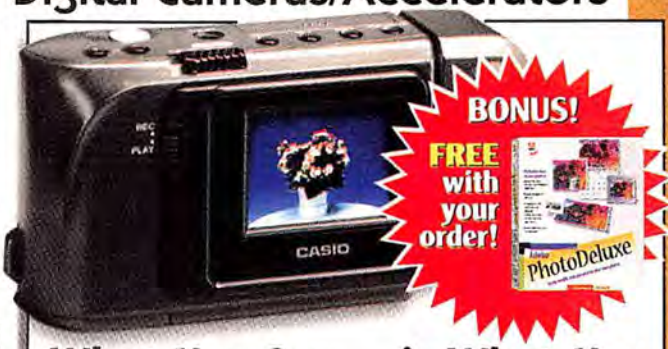

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Make sure your pictures are perfect! It's easy with the world's first digital image camera with its own built-in liquid crystal display. This high-quality camera gives you a "sneak-preview" of your image, allowing you to eliminate any "less-than-perfect" photos. You'll have perfect photos for your company newsletters, presentations and Web pages. You can even connect it directly to your computer (or TV) for big-screen viewing!

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QV-10A-Plus Liquid Crystal Digital Camera w/Adobe PhotoDeluxe CD

Only $499.99 #79768

Manufacturer: Casio

AC Adapter for QV-10A-Plus ..... $19.99 #80430
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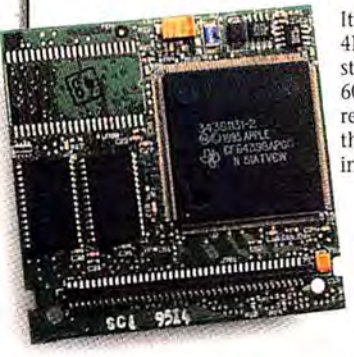

It's easy with the NUpowr accelerator. It replaces the 4MB 68LCO40 processor daughtercard (that came standard in your PowerBook 500) with a 117MHz 603e processor. It includes 4MB of memory, which replaces the 4MB of standard memory installed on the original 040 daughtercard. So you can enjoy the increased speed of PowerPC™ native software applications, and take advantage of your PowerBook 500's built-in Ethernet and still retain your existing fax/data modem. You'll have the FASTEST PowerBook available! Plus, the NUpowr includes the renowned speed-boosting utility Connectix Speed Doubler, absolutely FREE. Order one today. You could be power-boosting your 500 by tomorrow.

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PowerPC 604-150/604e-180/604e-200	Price	ORDER#
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Price includes $100 rebate for old daughterboard from MicroMac.

68040 Quadra 700/900 Accelerators...100/50MHz

Quadra 700/900	w/o FPU	ORDER#	w/FPU	ORDER#
SpeedDoubler 50MHz	$299.99	#81101	$399.99	#81102

Double the 68040 processing speed of your Quadra 700 or 900 up to 100MHz. The MicroMac SpeedDoubler040 features a 100/50MHz 68040 (with optional FPU), 128KB onboard cache and zero-wait state technology for advanced system processing throughput. With the Speed-Doubler 040 you get unprecedented performance and dependability for all your computing needs. Featuring an unique slot-free design that does not require any NuBus slots, the SpeedDoubler040 plugs directly into the CPU socket on your logic board, thus allowing for added expandability.

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Carrera040 66/33MHz 68040	$249.99	#73306	$299.99	#73307
Carrera040 80/40MHz 68040	$299.99	#73308	$399.99	#73309
CarreraTurbo128KB Cache Card	$99.99	#73322		

Macintosh IIsi	w/o FPU	ORDER#	w/FPU	ORDER#
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Carrera040 66/33MHz 68040	$299.99	#73310	$349.99	#73311
Carrera040 80/40MHz 68040	$349.99	#73312	$399.99	#73313
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Macintosh II	w/o FPU	ORDER#	w/FPU	ORDER#
Marathon 32MHz 68030	$99.99	#79091	$149.99	#79092
50MHz DiiMO 030 w/64KB Cache	$249.99	#79093	$299.99	#79094

Macintosh SE/30	w/o FPU	ORDER#	w/FPU	ORDER#
50MHz DiiMO 030 w/64KB Cache	$249.99	#79089	$299.99	#79090

Macintosh LCIII	w/o FPU	ORDER#	w/FPU	ORDER#
50MHz DiiMO 030 w/64KB Cache	$199.99	#79087	$249.99	#79088

Starting at $199

Also available for the Macintosh® IIcx & IIx

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Starting at $199

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ThunderCachePro 32MHz 68030 w/32KB Cache & 4 SIMM Scks	$249.99	#69224	$299.99	#69225
ThunderCachePro 50MHz 68030 w/32KB Cache & 4 SIMM Scks	$299.99	#69226	$349.99	#69227
ThunderCachePro 50MHz 68030 w/32KB Cache & 4 SIMM Scks	$299.99	#69235	$349.99	#69236
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80/40MHz Mac IIci ....$299.99 #75696
80/40MHz Above+FPU .$399.99 #75697
80/40MHz Above+FPU/128K cache .....$499.99 #75698

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100/50MHz Quadra 610 .$399.99 #71780
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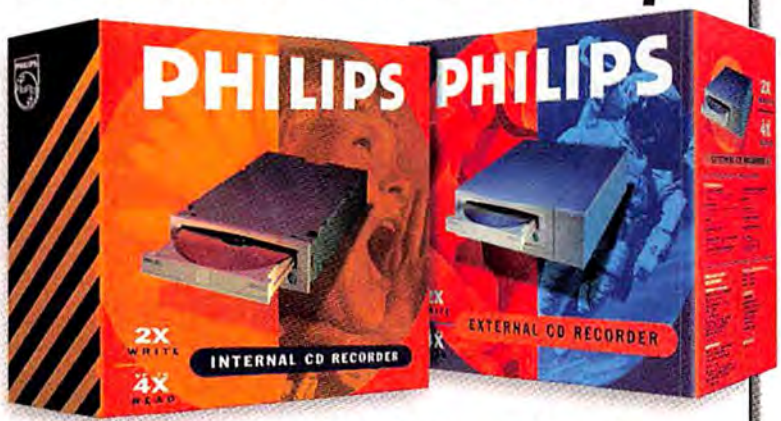

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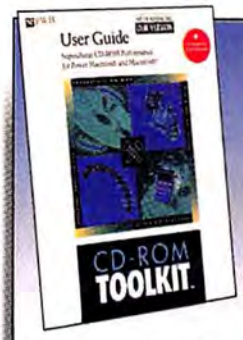

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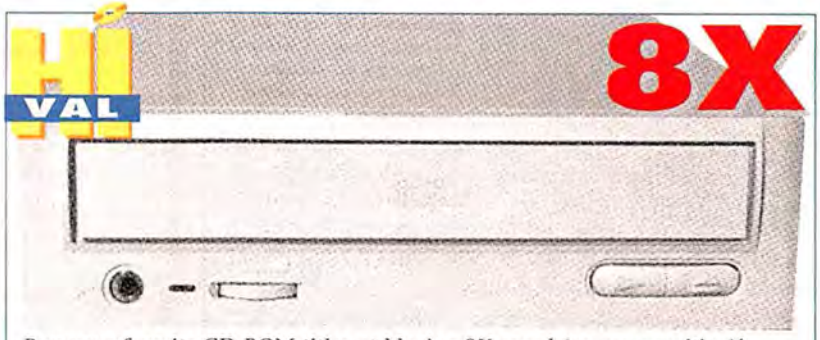

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VST Expansion Bay 230MB Magneto Optical Disk Drive for 190/5300 PowerBook

$399.99 #78899

VST Expansion Hard Drives

- Average access times less than 15ms; data transfer burst rates greater than 5MB/sec
- Super rugged; withstands up to 150g's

Expansion Bay Hard Drive 640MB

$429.99 #81335

Expansion Bay Hard Drive (1.2GB) for PowerBook 190/5300 ..... $799.99 #75257

Charger 5000 AC Bundle (Charger 5000, FREE Apple AC adapter)	$189.99 #79355
Charger 5000 DC Battery Bundle includes one 190/5300 Battery and one Charger 5000	$269.99 #78415
Apple 500 Series PowerBook Battery (Internal Intelligent battery)	$124.99 #79356
PowerBook Duo 2300 Battery	$99.99 #79357

30-Day money-back guarantee. One-Year limited warranty on electronics. Six-month limited warranty on batteries.

It's the Easiest Way to Record Your Expenses!

Capture, print and fax your expense reports directly from your Newton! ExpensePlus 2.0 automatically calculates your mileage and reimbursement. And you can even link it to your desktop computer to automatically fill in expense reports created in MS Excel or FileMaker.

$88.99 #78190

Publisher: WalletWare Inc.

Take Expense Plus 2 with you on the road for instant records of all your traveling expenses (and get reimbursed in record time)!

Improve Handwriting Recognition With WriteRight Screen Protectors!

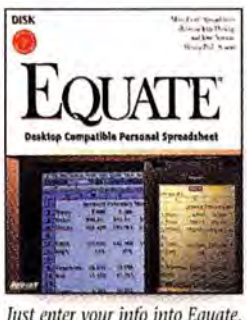
WriteRight is a unique plastic film that simulates writing on paper to improve handwriting recognition. Plus it protects your PDA investment from screen scratches and reduces glare.

WriteRight easily peels on and off your PDA screen (it's a foolproof way to protect your investment).

WriteRight For All Newtons $24.99 #82028

WriteRight for US Robotics Pilot ..$24.99 #82029
WriteRight for Sony Magic Link ...$24.99 #80503 Publisher: Concept Kitchen

Run Spreadsheets on Your Newton with Equate!



Equate™ is a spreadsheet with desktop features, that runs on your Newton®. It gives you direct data entry, spreadsheets of any size and Excel® compatibility using Equate Connect™ software (sold separately).

- Import/export multiple sheets at once
- Works directly with Excel format
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Publisher: Hotsoft Inc.

Just enter your info into Equate, then download the spreadsheet to your desktop later!

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A full-featured, mobile record system designed to mimic the workflow of the physician.

- Includes pharmaceutical library of 900 medications
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PHYSI

Manage & Organize Your Newton Lists!

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- Over 100 ready-to-use templates
- Integrates with built-in Names

Published by: Pelican Ware Inc.

QuickFigure Pro 3.0	$49.99 #77059
NewtCase 3.0	$44.99 #77451
Avail Works 2.0	$63.99 #74192

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Newton

New MessagePad 130 boasts improved features and system software!

NEW Apple® MessagePad 130

Includes NEW Backlighting Display, Non-Glare Screen and 2.5MB of RAM!

Introducing the Apple MessagePad 130 with the improved Newton 2.0 operating system (recent winner of the "Best of COMDEX" in its category at COMDEX '95). The new MessagePad 130 features new controllable backlighting for working anytime, day or night. Its non-glare screen provides easy-on-your-eyes comfort. And it includes increased system memory—2.5MB for running all your favorite third party and Newton software. You also enjoy improved performance with Internet communications applications, as well as improved multi-tasking support.

Plus it's powered by the Newton 2.0 operating system (the premier handheld platform in the market). This new system delivers overall improvements in speed, performance and system management.

Order your Apple MessagePad 130 today. With all its new features it'll be easy to stay organized, stay on schedule and be more productive wherever you go!

NEW Features!

- User-controllable backlighting
- Non-glare screen for easy viewing
- Additional system memory
- Improved multi-tasking support
- Improved Internet communication applications

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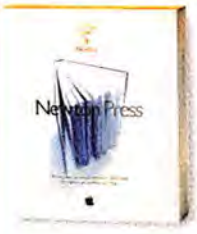
Look at All You Get with the NEW MessagePad 130!

- Improved handwriting recognition and outliner
- Easy contact and calendar management
- Fax send and receive
- Internet mail send/receive through third-party e-mail applications
- Connect to your computer using included Newton Backup Utility
- Keep in touch via fax, infrared beaming and paging

PLUS it Includes

➤ New 2.0 OS ➤ Pocket Quicken ➤ Newton® Backup Utilities



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Newton

With Newton Press for Windows™ PC or Apple Macintosh computers, you can easily publish electronic documents and distribute your book to anyone with a Newton PDA for viewing, annotating, faxing, or printing.

$69.99 #77446

Newton Press for Windows™ (works with 1.1 and 2.0 OS) **$69.99 #77445**

NEW Portable, Lightweight Newton® Keyboard

Now you can enter information into your MessagePad with Newton 2.0 as fast as you can type. This touchtype comfortable keyboard is lightweight and portable and comes with an attractive carrying case, so you can take it wherever you take your MessagePad.

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Newton Print Pack (connect to parallel printer)	$89.99	#61815
Powerforms	$89.99	#65621
Newton Toolkit 1.6	$299.99	#78720
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Storage

2MB Flash Storage Card	$99.99	#61805
4MB Flash Storage Card	$199.99	#63653

Cases

MessagePad Wireless Communications Case, holds cellular phone, modem, MessagePad & cards	$69.99	#78313

Power

External Battery Booster Pack (holds 8 AA batteries)	$24.99	#61814
AC Power Adapter	$29.99	#62007
Battery Charging Station	$84.99	#65006
Rechargeable Nicad Battery Pack (holds 4 AA batteries)	$19.99	#65010

Newton MessagePad 120

- Built-in notepad, to-do list, datebook
- Wireless and alphanumeric pages
- Fax, page, and e-mail
- Recognition software for writing
- Telephone log, Address file
- Pocket Quicken for expenses
- Pen-based navigation
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NOW WITH NEW 2.0 Operating System

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6' Keyboard Extension Cable-Mini Din 4 M/F ....$5.99 #77784
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Quality cables at knockout prices!

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10' Mac to HP LaserJet Cable Mini Din8-DB25M .....16.99 #83408
6' Mac+ to ImageWriter II Cable Mini Din8M/M .....6.99 #77754
10' Mac+ to ImageWriter II Cable Mini Din8M/M .....7.99 #83345
15' Mac+ to ImageWriter II Cable Mini Din8M/M .....9.99 #83346
6' Mac+ to High Speed Modem Cable Mini Din8M-DB25M ..7.99 #83365
10' Mac+ to High Speed Modem Cable Mini Din8M-DB25M ..9.99 #83364

Video Adapter

This compact video adapter boasts switchable resolution.

VGA to Mac Video Adapter, HD15F-DB15M .....$14.99 #77783

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Free up desk space with this extension kit!

6' Mac Extension Kit: KB, Monitor & AC Cables .$23.99 #77777
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Networking Devices

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PhoneNet Connector MiniDin8, with Term, Switch, Locking ..$16.99 #77983
PhoneTalk with DB9M & Terminator Switch .....16.99 #83237

Complete with built-in switch selectable termination.

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Features stranded wire for greater flexibility.

3' RJ45 Category 5 Patch Cable-Blue .....$4.99 #75198
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25' RJ45 Category 5 Patch Cable-Blue .....14.99 #61743
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The easy, dependable way to expand Thinnet networks.

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Enjoy better shielding for higher reliability!

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SCSI-1 Cent50M/F, 2 sided, active .....21.99 #82988
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Share up to 4 printers with just one device!

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Features switchable docking feature for the ultimate in portability!

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Here's Why Your Network Needs NetDoubler!

NetDoubler requires no configuration, uses little memory and works on all Macintosh applications.

Gain the performance you've always wanted from your Macintosh-based networks (10 mpbs or faster) with Asanté's NetDoubler. File transfers between computers will improve from two to nine times their current speed. When used in Fast Ethernet networks, the increase is most dramatic—for example, a 20 megabyte file that took one minute to open over the network can be opened in less than 10 seconds with NetDoubler!

NetDoubler $59.99 #80691

Asanté FAST Ethernet Family Products

AsantéFAST™10/100 PCI Adapter 10-Base-T or 100Base-TX (PC or Mac™), comes with FREE NetDoubler	$208.99	#81304
AsantéFAST™10/100 NuBus Adapter, with FREE NetDoubler	338.99	#81536
Asanté100TX Hub/6, (6)100Mbps RJ-45, Plug & Play	968.99	#78179
Asanté100TX Hub/12, (12)100Mbps RJ-45, Plug & Play	1568.99	#78178
AsantéFAST™100TX Stackable Hub, (12) 100Mbps RJ-45, Plug & Play	1599.99	#72122
AsantéFAST™100TX/FX Stackable Hub, (8) 100Mbps RJ-45, 100Base-FX	1678.99	#78157
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Micro Asanté Print 10-T, (1) RJ-45 & (1) AUI port, supports up to 8 Apple LocalTalk® Devices	$298.99	#66373
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Desktop EN/SC-10T Adapter, 10Base-T to (SCSI DB25)	198.99	#82002
Desktop EN/SC-10T Adapter, 10Base-T or 10Base-2 to SCSI (DB25)	248.99	#82003

MacCon Cards

MacCon CS-10T, Com Slot 10Base-T	$78.99	#78219
MacCon-i LC, LC PDS Slot 10Base-T, FPU socket	94.99	#64557
MacCon-i NuBus™, (1) 10Base & (1) AUI Port	109.99	#64564

Ethernet Transceivers—Plug-and-Play Simplicity

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The simple-to-use modular approach to connecting to Ethernet networks is to use an Ethernet Transceiver. Simply attach the appropriate transceiver to your Macintosh® computer and connect the network cables.

Friendly Net Media Adapter 10Base-T Works with PowerBook® 500, Apple® Power Macintosh®, Macintosh Quadra® & Macintosh Centris®.

Friendly Net Media Adapter Thin, self-terminating ..... $48.99 #65701

Presenting Asanté Plug-and-Play Ethernet Hubs

Ideal for creating small networks or extensions to existing networks.

These four Asanté cost-effective Ethernet hubs easily let you connect your Mac™ or PC workstations (including UNIX), network printers and other network resources to an Ethernet network.

10Base-T 24-Port Hub (24) RJ-45 & (1) AUI Port	$418.99	#69126
10Base-T 12-Port Hub, (12) RJ-45 & (1) BNC & (1) AUI port	258.99	#69125
10Base-T 8-Port Hub, (8) RJ-45, (1) BNC & (1) AUI Port	138.99	#69124
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ASANTÉ All Products Backed by a Lifetime Warranty!

Farallon® Surf the Internet at 128Kbps Speed!

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Timbuktu Pro for Macintosh® combines remote control and file transfer with built-in Apple™ Remote Access (ARA) client. You can access your network and other Timbuktu users can share screens, send files, access servers and printers. Now Power PC™ native.

Timbuktu Pro 2.0 (Single User)	$137.99	#77551
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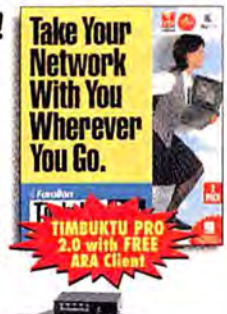
Timbuktu Pro 2.0 (10-Pack)	659.99	#77553



Ethernet 10-T Starlet Hub

The easiest mini-hubs for building EtherNet Networks. Plug into any 10Base-T device or link hubs together or to a network back bone.

4-Port Ether10-T Starlet Hub (4RJ45 1BNC Non-Mgmt)	$119.99	#65944
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16-Port Ether10-T Starlet Hub (16RJ45 1 BNC 1AUI)	419.99	#65946
Airdock Adapter	$68.99	#74469
PhoneNET Bonus Pack (3 Din-8 Connectors)	48.99	#64156

EtherMac PC Cards

Super-fast Ethernet for your PowerBook®. Take advantage of the PC Card slot in your new PowerBook® 5300 and 190.

EtherMac PowerBook® PC Card w/10Base-T	$169.99	#74471
EtherMac PowerBook® PC Card Combo w/10BT & TN	228.99	#74470

Introduction to Etherwave

Connect your PC, Mac and printer to Ethernet daisy-chainable 10Base-T! EtherWave products make it easy to network your Mac, PC, workstation, and printer—quickly & economically. Each product has 100% 10Base-T compatibility & a lifetime warranty.

EtherWave® AAUI Transceiver	$99.99	#77549
EtherWave® Printer Adapter/Apple LocalTalk®	279.99	#62634
EtherWave® Adapter for Apple® PowerBook® and Mac™ (w/ADB)	279.99	#72496
EtherWave® MultiPrinter Adapter	339.99	#67313
EtherWave® PowerBook® PC Card	249.99	#74472

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FastEtherTX-10/100 Nubus Card	$329.99	#74474
FastEtherTX-10/100 PCI Card	244.99	#73243
FastStarlet 100/TX-8	1398.99	#77832
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- Installs in only minutes
- Provides everything you need to call and answer Macintosh computers
- Client and server software together
- Requires no specialized equipment

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Apple® Remote Access Client 2.0.1 (10-Pack) ..... $458.99 #66790
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Apple® Ethernet AUI Transceiver

Apple Ethernet AUI Adapter. This adapter adds an IEEE 802.3 AUI to any Macintosh computer or Ethernet card equipped with an Apple Ethernet port, and can be used to connect to external transceivers for use with fiber-optic, thick coaxial, and other Ethernet media.

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This high-performance, easy-to-use file & print-sharing software that allows networked Mac® and Microsoft Windows (including Windows® 95) software-based computers to share files, applications, and printers. With AppleShare®, your organization can store all of their shared files and applications in a single, central location, providing convenient, easy access to every user on the local area network.

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Apple® Ethernet LC 10Base-T Card	$94.99 #63647
Apple® Token Ring NB/c Card (7")	$459.99 #64863
Apple® PCI Token Ring Card	$489.99 #80333
Apple® 10Base-T Ethernet Transceiver	$67.99 #60205
Apple® Thin Coax Ethernet Transceiver	$67.99 #63768
Apple® Ethernet CS 10Base-T Card	$94.99 #65798
Apple® Ethernet CS Thin Coax Card	$94.99 #65799
Apple® Ethernet CS AAUI Card	$94.99 #65800
Internet Router Basic Connectivity Package 3.0.1	$388.99 #64736
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THE ANSWER FOR PAPERPORT™

PaperPort™ requires a constant connection. If you already have a printer and a modem, you need Port Juggler.

4 MORE PORTS:

Connect any four serial devices to one port on your Mac™; Printers, fax modems, label printers, Visioneer PaperPort™, cameras, MIDI, personal digital assistants.

SET IT & FORGET IT:

Port Juggler switches between the devices so you don't have to plug and unplug any cables.

FULLY AUTOMATIC:

Automatically switches to the right port for each device and even turns on the fax software for a fax modem. Starts up print spooling for a printer, and activates AppleTalk® for a network printer.

COMPATIBILITY

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- Communication software: America OnLine, AppleLink®, e•World™, ARA, MicroPhone, Z-Term, CompuServe, etc.
- Printers: AppleTalk® printers, LaserWriters, StyleWriters, DeskWriters, ImageWriters, DeskJets, GDT PowerPrint, Epson® Color Stylus, Fargo Primera, etc.
- Label Printers: CoStar, Seiko, Avery, P-Touch
- MIDI devices
- QuickTake® 100 Cameras
- Newton® Messagepad™
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- Visioneer PaperPort Vx
- and many others...

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Dayna Ethernet/Modem Cards Give You TWO Functions in One Space-Saving Design!

CommuniCard Plus, Ethernet Adapter & 28.8 modem, 10Base-T, RJ-11

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Dayna®

Keep connected to your network while you search online for information!

The CommuniCard Plus Ethernet/Modem combines both Ethernet adapter and a 28.8 modem into one Type II PC card. It lets your PowerBook computer access both a network and use a phone line at the same time. The CommuniCard Plus card also uses only one slot, leaving the second PC Card slot available.

- Ethernet Adapter and Modem
- Simultaneous Functionality
- Includes Integrated Fax and Data Software
- Compatible with Apple's Cards and Socket Services
- 5-year warranty and 24-hour replacement policy

CommuniCard Ethernet Adapter (10 Base-T) for PowerBook® w/PC Card Slot	$159.99 #74482
CommuniCard 28.8 Modem (PC Card-Cellular Ready)	$379.99 #74485
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NEW PRODUCTS!

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PC MACLAN for Windows®95
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Newer TECHNOLOGY EtherTech Cards

EtherTech Cards Give You the Fastest Performance of Any Ethernet Solution!

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- 2-year warranty, 30-day money back guarantee, toll-free technical support (in U.S.)

L10 EtherTech Ethernet Card
$69.99
#71697

C10 EtherTech Ethernet Card
$74.99
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Instant PC to Mac™ Networking Kits!

Apexx TECHNOLOGY INC.

Connect Windows™ and Windows® 95 PCs to Macintosh®!

Just snap an Apexx adapter onto your PC parallel port for instant printer and file sharing between PC and Mac™. Apexx adapters are available in either PCTalk for Apple® LocalTalk® networks or EtherChain for Ethernet networks. Miramar Personal MACLAN software is included for Windows™/Windows® 95 so PC and Mac™ users can share resources in ***both directions***.

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$299.99 #74667

PCTalk Network Adapter ..... $159.99 #74666
EtherChain Personal MACLAN Kit .. $349.99 #74668

28.8Kbps Speed and a MacMall Low Price Make this Modem a Best Buy!

28.8 Kbps

5 Year Limited Warranty

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- External send/receive data/fax modem
- Data modem 28,800 baud with V.34, V.32bis, V.42bis
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The Sportster® Voice 33.6 V.34 Fax modem with Voice Mail for Mac™ was $219.99, and now it's just $199.99. You SAVE $20! It delivers 33.6Kbps, a full-duplex speakerphone, a personal database for managing your phone, fax and e-mail and even a guidebook to the World Wide Web.

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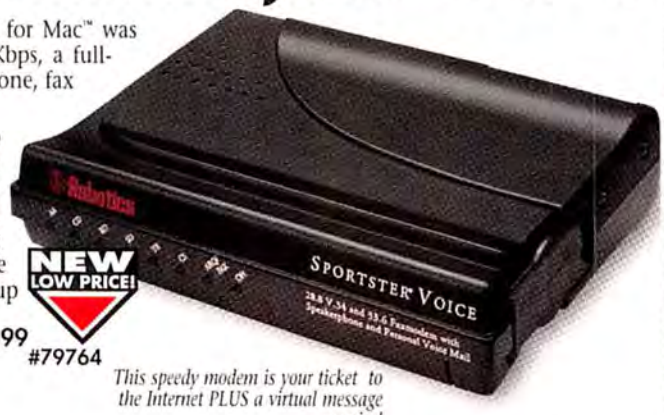

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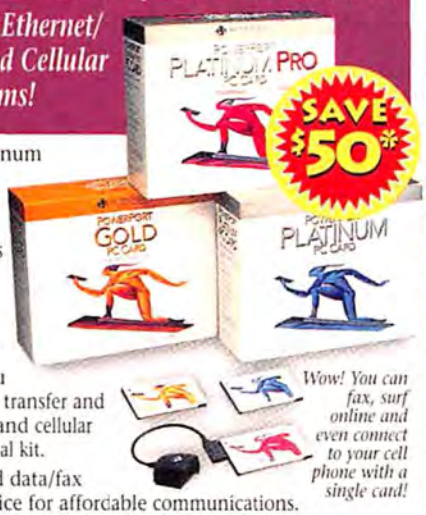

1. The PowerPort Platinum Pro combines 10Base-T ethernet, 28.8 Kbps/V.34 data transfer and 14.4 Kbps faxing and cellular capability with optional kit.
2. The PowerPort Platinum gives you v.34 28.8 Kbps data transfer and 14.4bps fax transfer and cellular capability with optional kit.
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- Fax to any Group 3 fax machine worldwide
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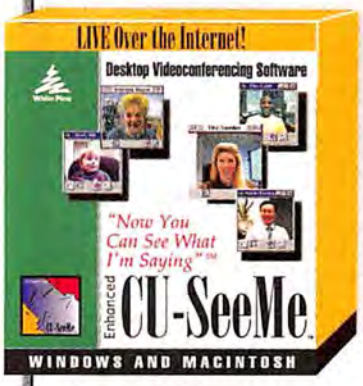

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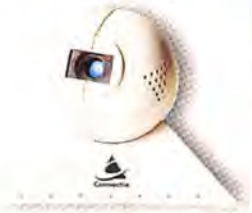

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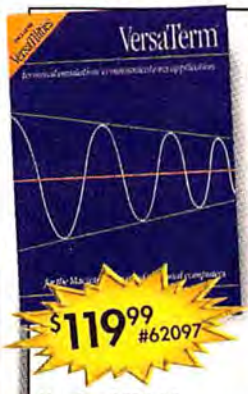

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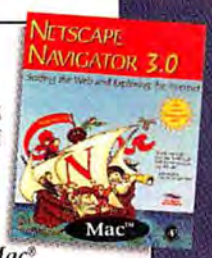

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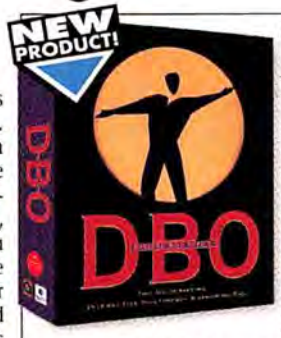

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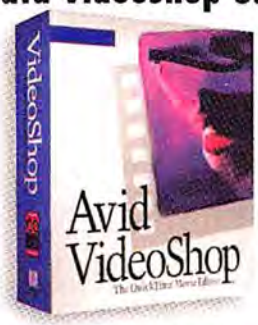

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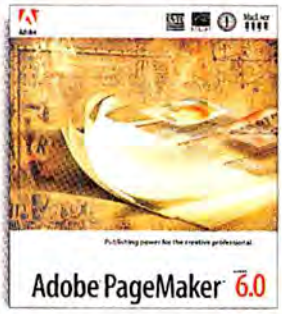

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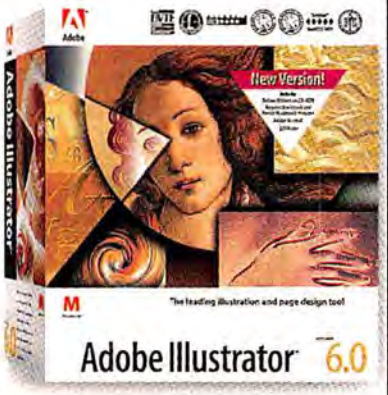

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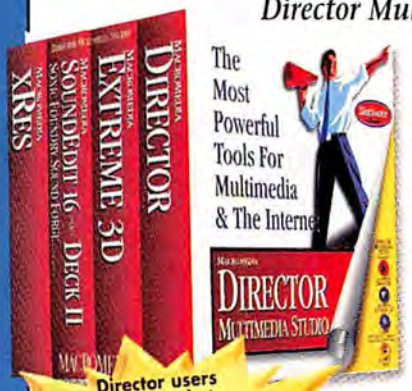

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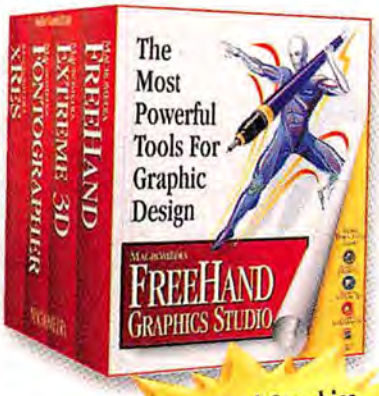

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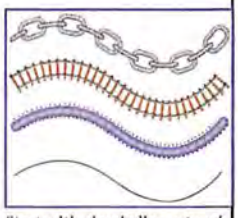

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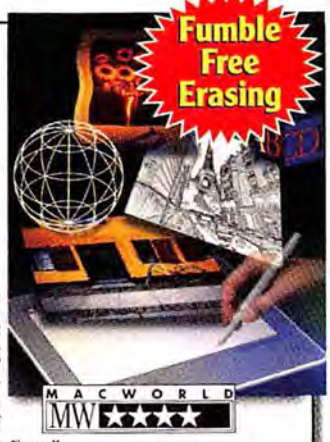

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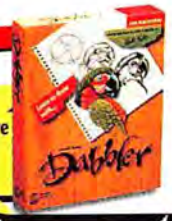

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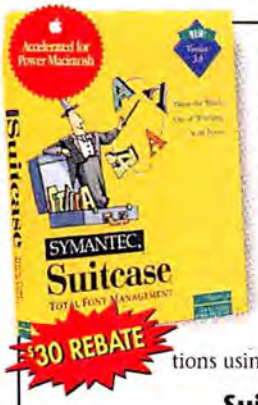

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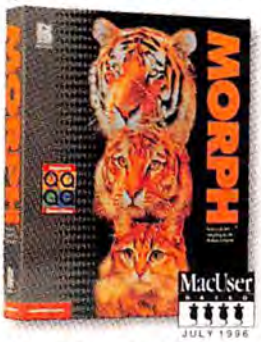

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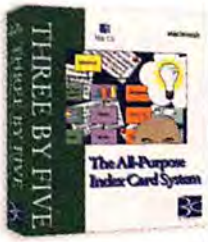

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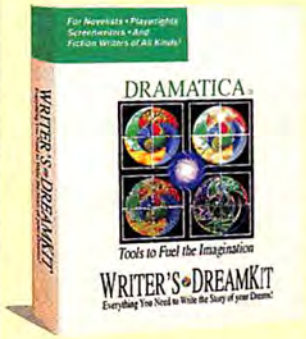

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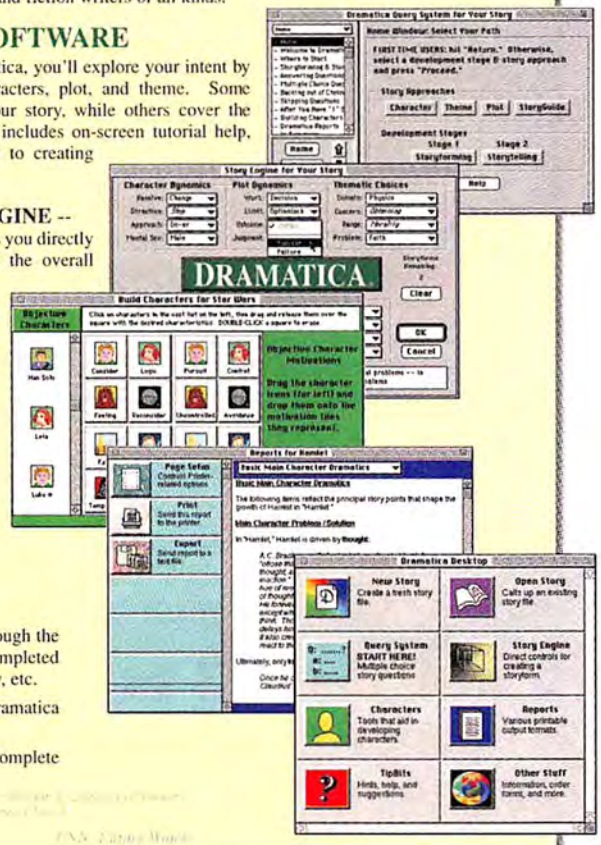

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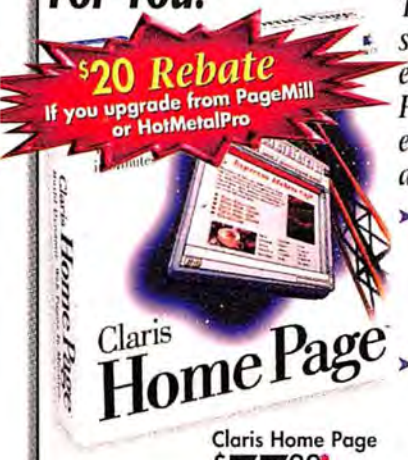

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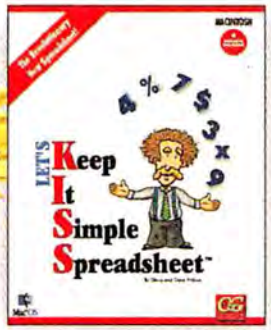

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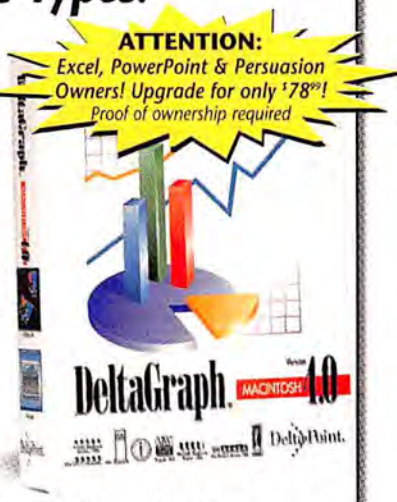

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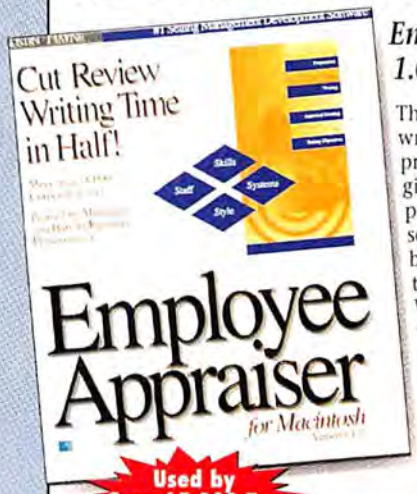

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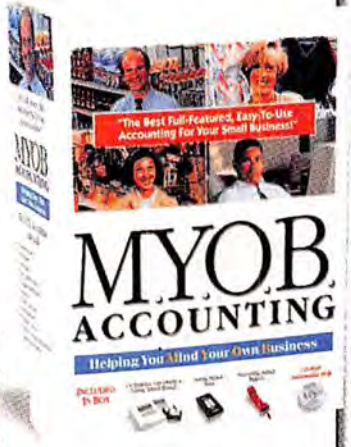

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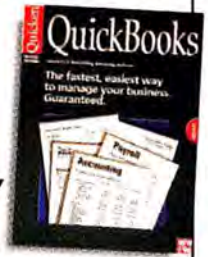

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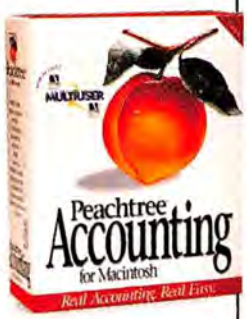

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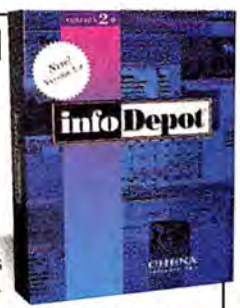

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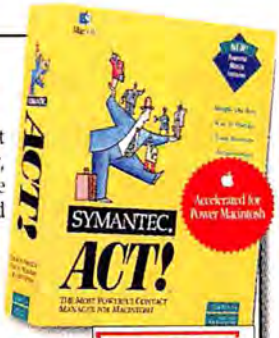

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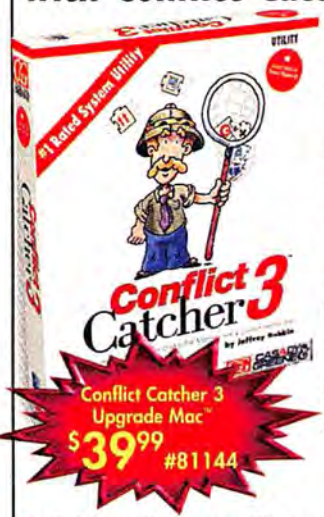

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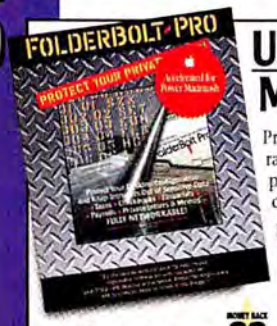

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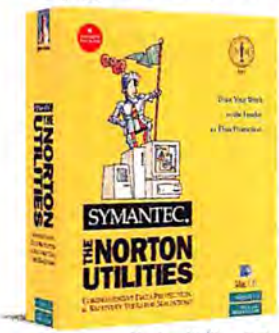

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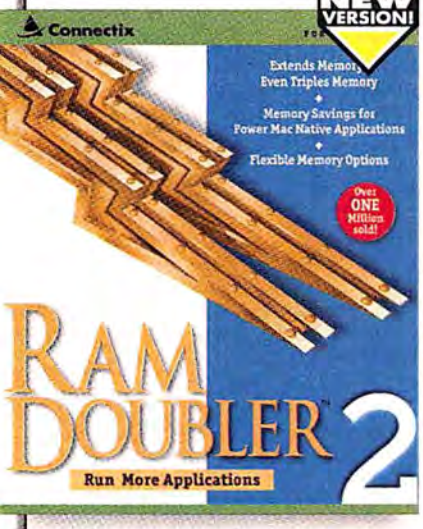

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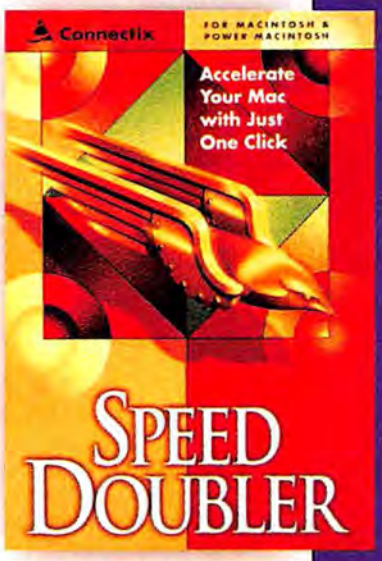

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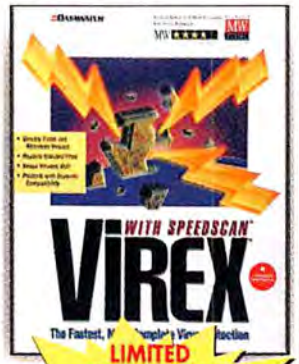

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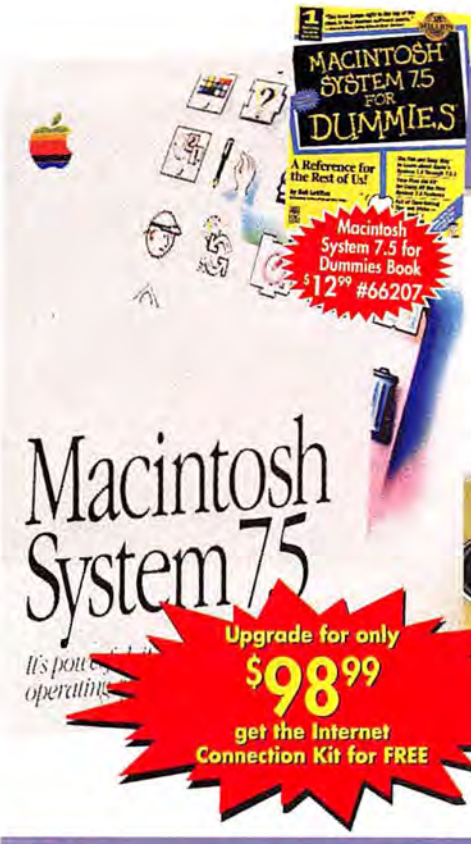

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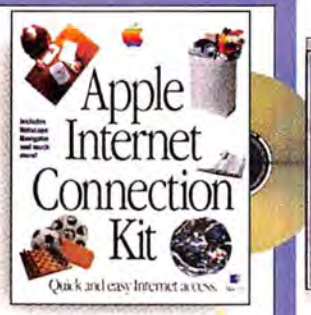

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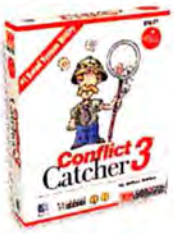

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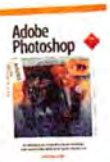

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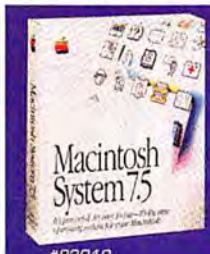

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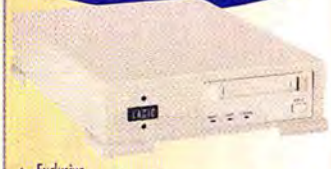

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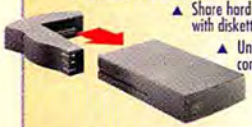

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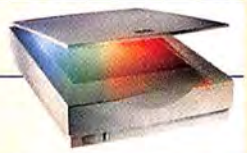

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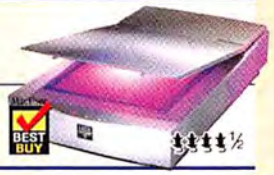

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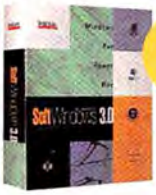

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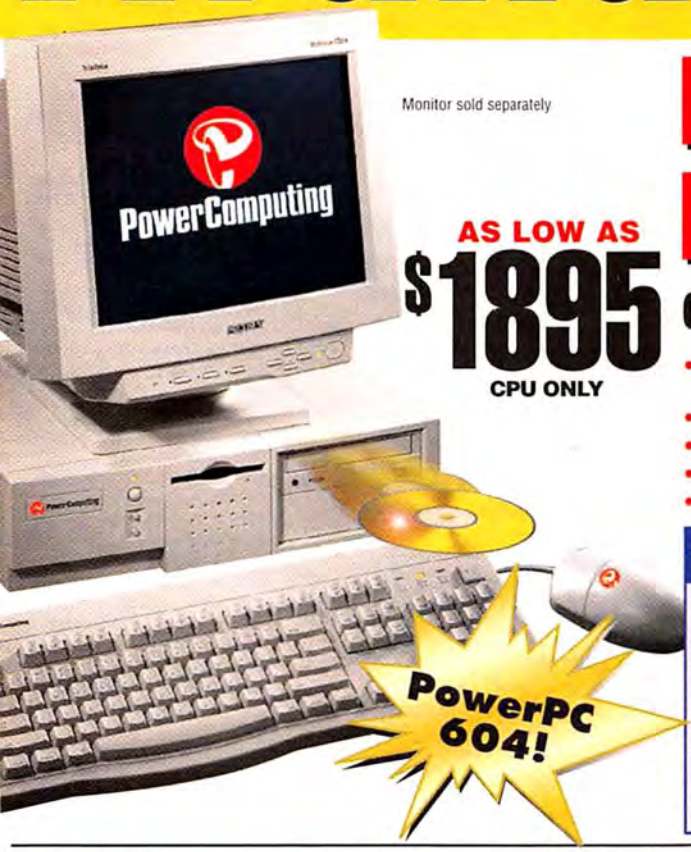

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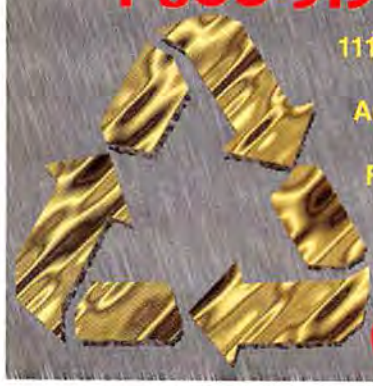

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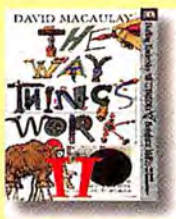

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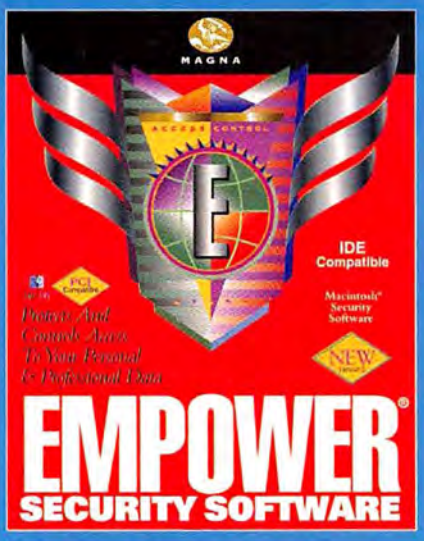

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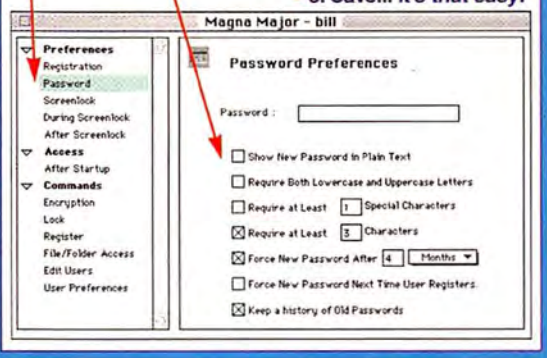

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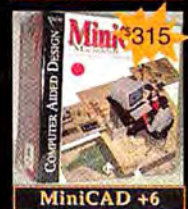

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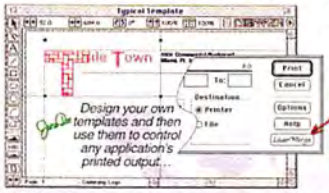

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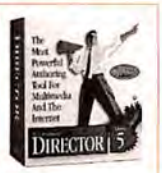

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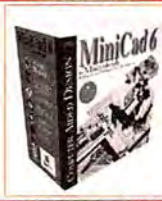

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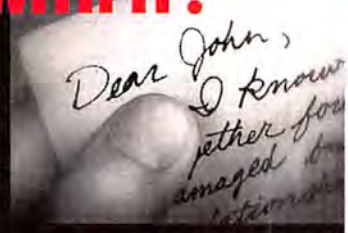

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ANDY IHNATKO

Sixty-Eight Twenty or Fight!

THE FIRST THING ABOUT COPLAND (a.k.a. Mac OS 8) that troubles me is the nagging suspicion that through some strange twist of fate, Apple's fortunes have become intertwined with those of Sylvester Stallone. Sly, too, has watched his fortunes dip precipitously of late, along with public perception of his commercial viability, so he, too, is developing a new release entitled *Copland* with the knowledge that if this thing bombs, it'll be time to sign the paperwork for that psychic-hotline deal. And when you read, as I have, that Stallone has gained 30 pounds for his upcoming role and that a minimum install of System 8 will take up 50 MB, well, any die-hard Macintosh aficionado will nervously begin to search Apple's product history for evidence of a *Stop! or My Mom Will Shoot.*

But that's not my main worry (sure, there was the Apple III, but at its very worst, that was a *Tango & Cash*). No, that honor goes to the announcement that System 8 will run on PowerPC systems exclusively. It's not an all-consuming dread (*that* honor goes to the idea of *Copland*-the-movie successfully jump-starting Stallone's career), but it's unquestionably a pivotal moment in the maturing process of the Mac OS. For the first time since the original two Macs were created, Apple will divide the entire community into two groups: Those Who Can Run the Latest Version of the System, and Those Who Must Make Do.

It had to happen eventually. System 8 will arrive with a host of new interface tweaks and fundamental system features that will make for camera-grabbing eye candy, but the bread-and-butter draw will be the fact that, for the first time, the entire OS is experiencing a revolution instead of the incremental evolution that has been going on in the decade since System 6.0. System 8 isn't about OpenDoc and system-level Internet integration. It's about native code and multithreading. System 8's key features are to the Mac what fuel injectors and onboard computers were to the automobile: fundamental improvements to the way the technology operates, changes that don't appear in the form of a new button to push. They're replacements, not upgrades, and there are severe limits to how far one can go to make such a Thoroughly Modern OS run on hardware that was on the drawing boards back when the idea of a document containing both text and graphics was real Buck Rogers stuff.

It's not a feature that tends to make it into print all that often, but among the Mac OS' many singular achievements is its ability to run on virtually anything. Compatibility isn't a function of what model of Mac you have or how fast it runs: If you have a big enough hard drive and a reasonable bare minimum of RAM, you can run the latest OS Apple has to offer. The PC world has at least five separate classes of computer, each defined by the various points in DOS and Windows history when entire specifications became obsolete. Apple, in comparison, has really left behind only owners of 128K and 512K Macs, which, of course, was perfectly safe. Just before the Plus was introduced, the Macintosh community consisted entirely of 128K and 512K Mac owners who were rich enough to get in on the ground floor and therefore could afford to upgrade. The rest of us, who more or less hated the first group's guts, were secretly pleased to see 'em all get hit with the massive cost of a logic-board swap. Everyone was happy!

Today, things are different. Granted, you won't find too many Fortune 500 companies trying to outsmart the 1997 gold market with their Mac Pluses. But let's not forget that SE/30s, Mac LCs, and 680x0-based Performas are the backbone of hundreds of school computer labs. This strategic foothold has been maintained by the teachers' championing of the Mac OS within their departments and the fact that at no point did they have to petition their superiors for the funds to buy brand-new systems. When Copland is released, those of us making do with 132-MHz 604-based Macs will install System 8 and spend a glorious afternoon trying to generate a system crash that takes down the whole machine. But on that very same day, all the millions of owners of 680x0 Macs will have to ask themselves a hard question: Has it finally become too expensive to stick with the Mac? Will they have the courage not only to demand the funds for new hardware but also to demand permission to retain one of the handful of desktops in the building that lack Windows machines?

Rambo Redux

Of course, it's not quite so drastic as that. Apple will spin off the cooler technologies as system extensions for the older lot. Besides, Mac people are rebels, untamed mavericks who pride themselves on being part of The Correct Minority. Sure, they can't run System 8, but they can remake their self-image in the form of the Correct Minority *of* a Correct Minority — the segment that doesn't want to trust its valuable work to an unproved operating system. In operating systems, as in life, blind arrogance is a valuable survival skill. [*As we went to press, Copland as a single, monolithic release had been canceled. See Pamela Pfiffner's column in this issue. — Ed.*]

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